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EDUCATIONAL NEWS MAGAZINE—OCTOBER, 1946

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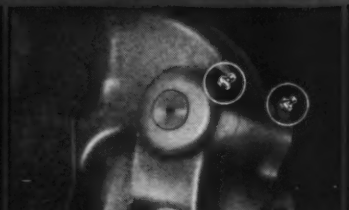

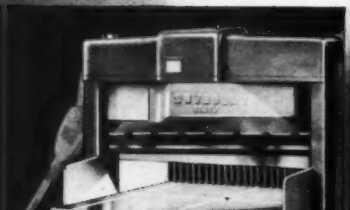

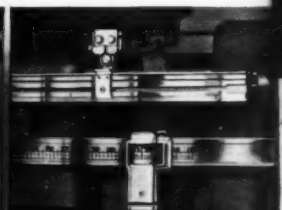

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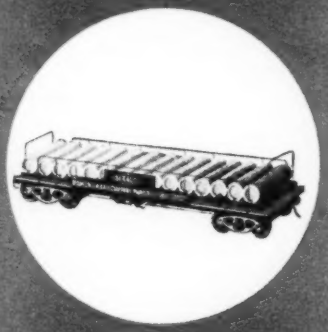

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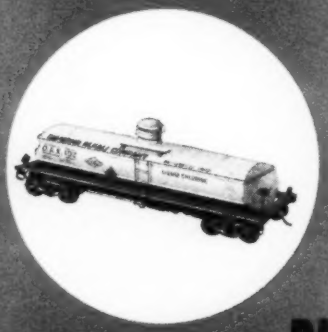

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—FEATURES—

Waxed Paper Machines . . . Their Development and Operation ..... E. E. Ferguson 979
Traffic Suggestions for Production Executives ..... C. E. Jones 985
Supplementary Summer Cooling in Paper Machine Rooms ..... L. G. Janett 986
Manufacture of High Alpha-Pulps in Wartime Germany ..... J. N. McGovern 988
New Slide-Film Series for Safety Instruction ..... Lyne S. Metcalfe 991
Detroit Meeting of TAPPI 994
TAPPI Holds First Engineering Conference 1000
The American Chemical Society 1024
Convention Papers . . . Abridged 1028

—NEWS—

Pulpwood Boom 930
Trade Winds 931
Associations 994
Safety 1004
Allied 1006
Names in the News 1010
Personals 1010
Necrology 1018

—DEPARTMENTS—

Editorial 965
Current Thought 966
Paper Sketches 992
Safety Contest Scores 1004
Coming Events 1004
Practical Shorts 1021
New Equipment and Supplies 1052
Technical Developments 1056
Papermaking Patents 1058
New Publications 1060
Current Market Quotations 1062
Index to Advertisers 1065

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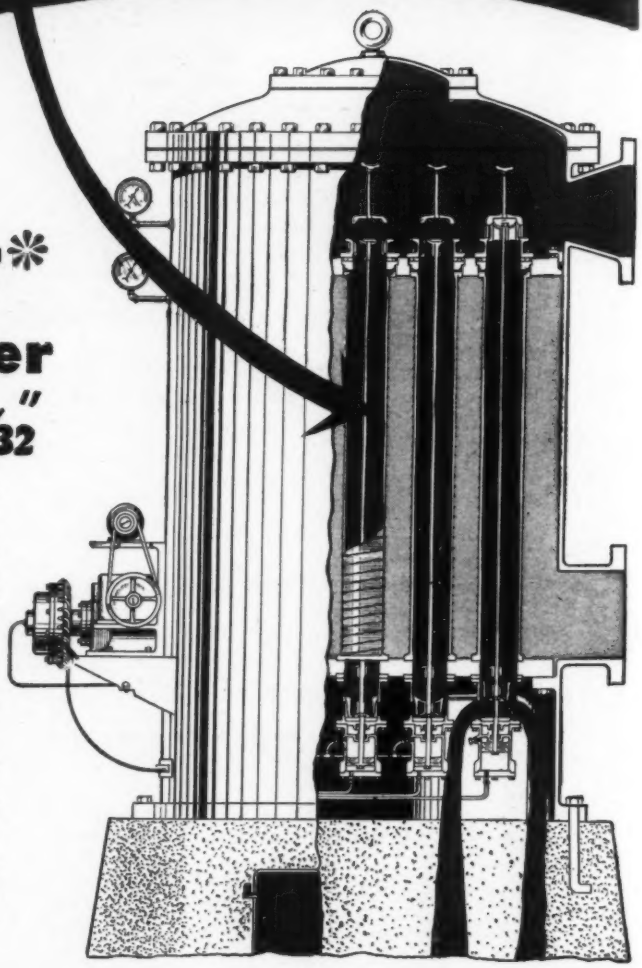

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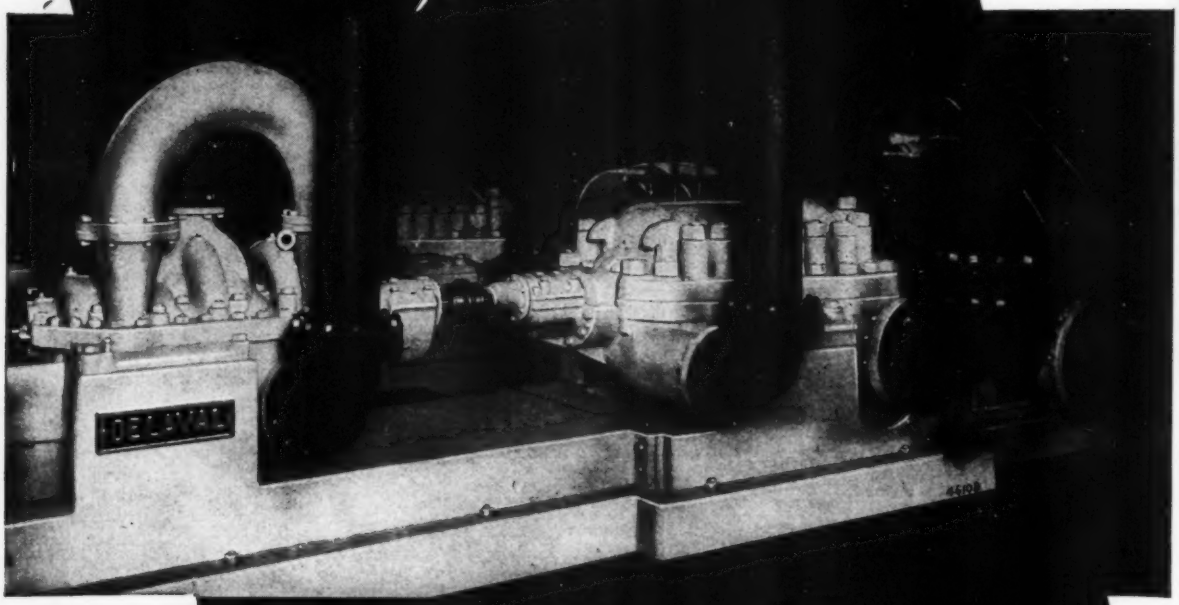

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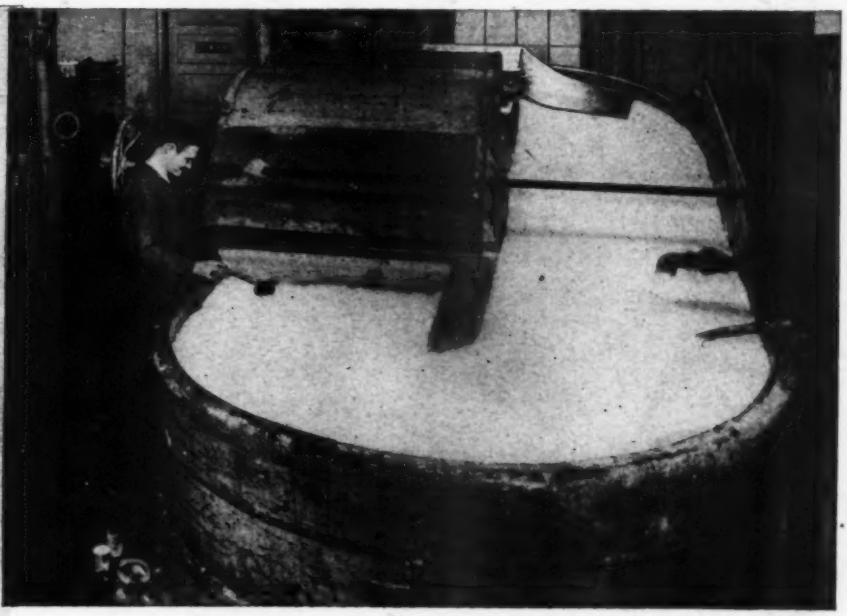

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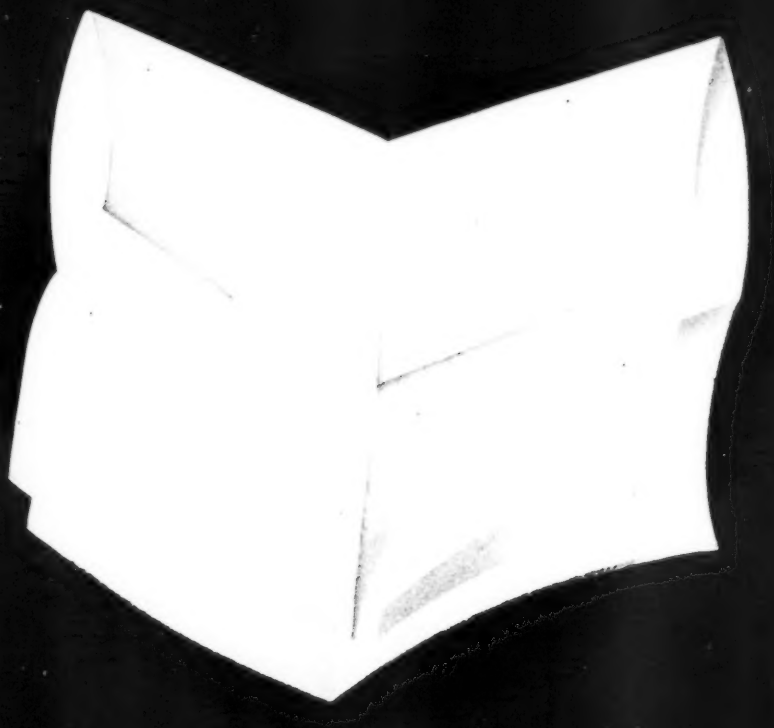

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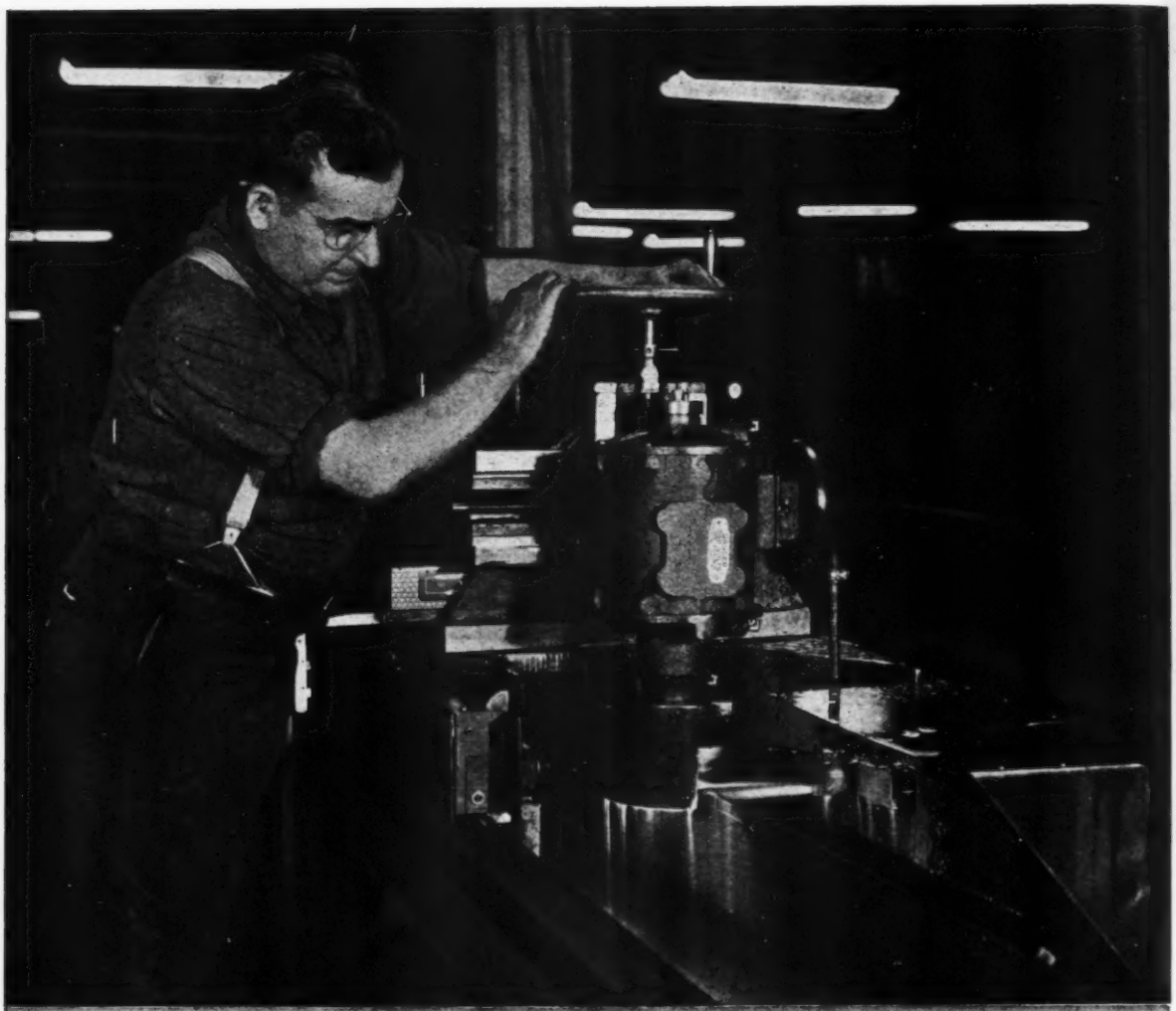

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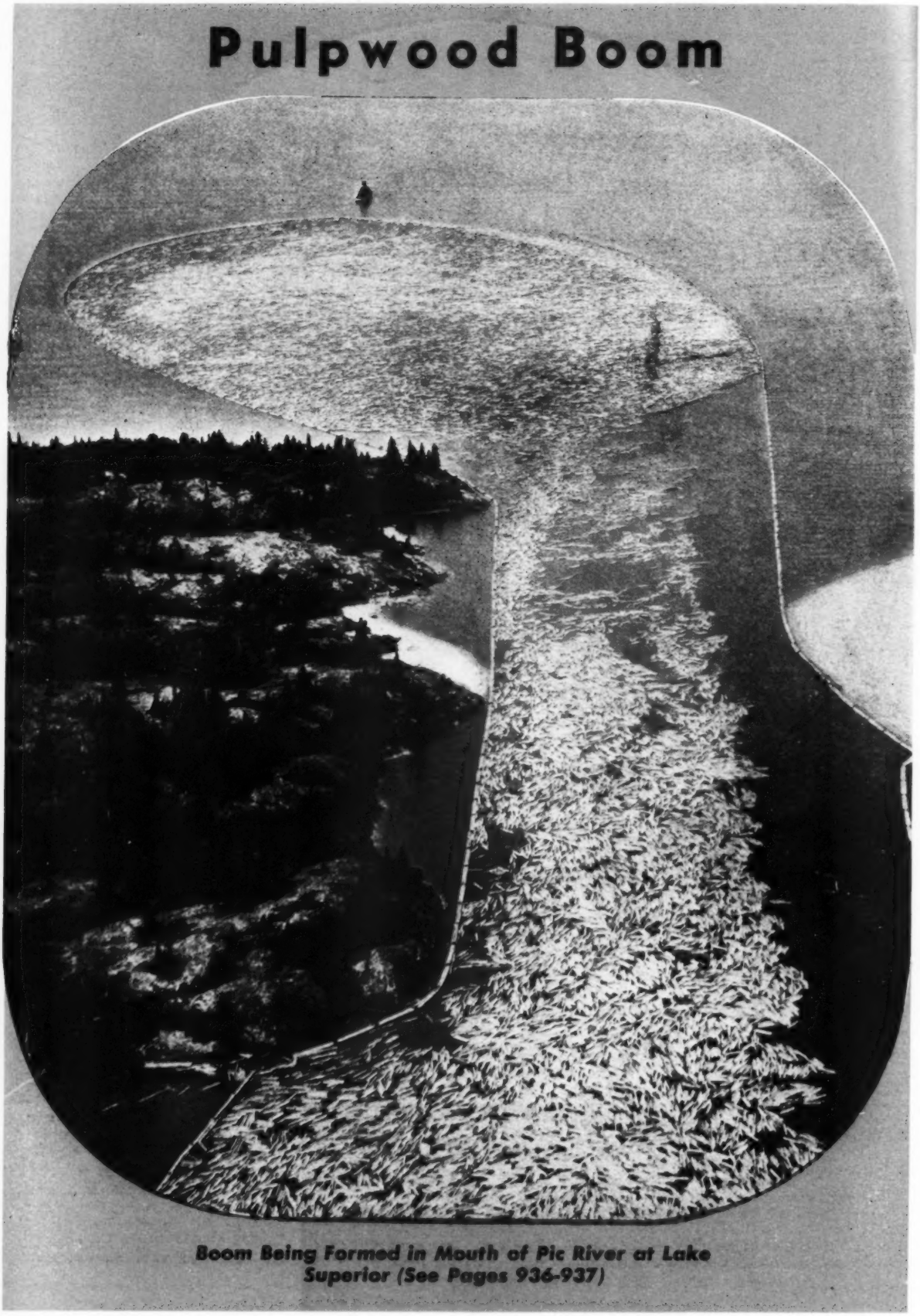
Pulpwood Boom



Boom Being Formed in Mouth of Pic River at Lake Superior (See Pages 936-937)

TRADE WINDS

A Long Haul for Pulpwood

▸▸▸ A NEW, WAR-BORN industry for Montana—shipping pulpwood to Wisconsin mills—is emerging from temporary status into the bloom of a postwar enterprise of growing significance. Starting from scratch early in the war period, this busines has doubled in volume each succeeding year. It is more than twice as large this year as last, having already passed the $500,000 a year mark. It has possibilities of expanding into the multi-million dollar class.

A pulpwood haul by rail of 1,600 miles seems like something out of this realm, but there it is; it's being done. More than 20,000 cords of some 900 cars rolled eastward in 1945 on three railroads serving Montana. This year, given enough freight cars, shipments are expected to top 50,000 cords in 2,000 carloads. Men connected with the industry are talking 100,000 cords for 1947, worth $1,000,000 f.o.b. Montana. If that's a "war baby" it surely has a healthy hangover beyond victory day.

Several factors conspired to start this trade. Montana has plenty of wood, Wisconsin mills needed it and were permitted to pay what it took to get the logs out of the woods. A special freight rate of $10 a cord was evolved for the railroads.

From the first the industry specialized in smaller sizes and some species, like lodgepole pine, not comonly used for lumber. In that and several other respects, it has had a beneficial effect on the Montana forest outlook. It has dealt in and put to use some tree species of which the state has an abundance without adequate outlets; it is helping convert stagnated forests into growing forests; it is promoting a cash value for thinnings and logging leftovers heretofore without much value. Besides, it has put new dollars into woodland poekets, has helped keep Wisconsin mills busy making paper and has helped keep the freight trains long and heavy on the eastward pull.

Having watched this trade mushroom, established forest industries of western Montana are keeping eyes peeled for developments and effects, but so far they have failed to detect anything injurious to their interests.

The facts and data used in this material were gathered and prepared by Harold Olson, western correspondent for the American Forest Products Industries, Inc.

View of pulpwood yard in Kalispell, Montana, where the 100-inch long logs are assembled and loaded out on gondola cars for the long trip to Lake States mills

DETROIT PUBLIC LIBRARY

Pulpwood logs being loaded into gondola car for the 1600-mile rail haul to Wisconsin pulp mills

In fact, under good cutting practices the pulpwood harvest can improve future sawlog yields. At least one major lumber operation is engaged in the pulpwood trade as a sideline. If there is to be competition between the new industry and the lumber industry for logs, it has not yet appeared on the scene. That's because the two deal in different types of raw material.

Anyone who had predicted this industry in 1940 would have been called crazy, yet all it took to touch it off in 1943 was a wood buyer from Wisconsin. Five thousand cords were dispatched that year, 12,000 cords in 1944. Now at the 50,000-cord level, the industry looks ahead to continued expansion based on good forest practices that produce timber in continuous crops. On that basis the sky seems to be the limit, for Montana has the wood and plenty of land to keep right on growing more; plenty of willing hands to harvest it at a price that gives the producers a fair market return.

Doubtless, however, such long hauls for pulpwood will intensify efforts to spur further forest growth in Wisconsin itself. The cost of hauling a cord from Montana would pay for planting an acre in seedlings and pay taxes on that acre long enough to produce more than a cord of pulpwood.

The men who harvest this wood are chiefly farmers filling in on this work when they have a spare half-day or when heavy farm work is largely buttoned up for winter. They get from $8 to $9.50 a cord delivered at a landing in the woods; from $10 to $11.50 delivered at the railroad. Englemann spruce and true firs are allowed the best prices but the real volume has been in lodgepole pine, a prolific western tree which was practically a commercial orphan prior to the war. Prices are set by the OPA, which stationed a forest products price specialist at Helena early in the game. Dealers and traders are permitted a handling fee of $1 a cord.

The wood is cut chiefly to 100-inch lengths and goes east unpeeled. Species in greatest demand are spruce and lodgepole pine, but some mills will take white fir, hemlock, ponderosa pine and larch in limited amounts. Tests at the Madison laboratory of the United States Forest Service show western larch as a good sulphate pulping species, but of course it rates below lodgepole pine because of its darker color and resulting higher bleaching requirement. Wood is salable down to a nominal small end diameter of four inches, which means a small percentage of 3½-inch sticks are permissible. The mills prefer logs under 14 inches in diameter inside the bark on the small end. Current shipment diameters average 8 or 9 inches. The railroads specify minimum loads of 25 cords per car, and ship mainly in gondolas.

I. V. Anderson, forest utilization chief at the Northern Rocky Mountain Forest and Range Experiment Station in Missoula, views the pulpwood development as a good thing for the Montana forest, which has long needed more outlets for pulp-type materials.

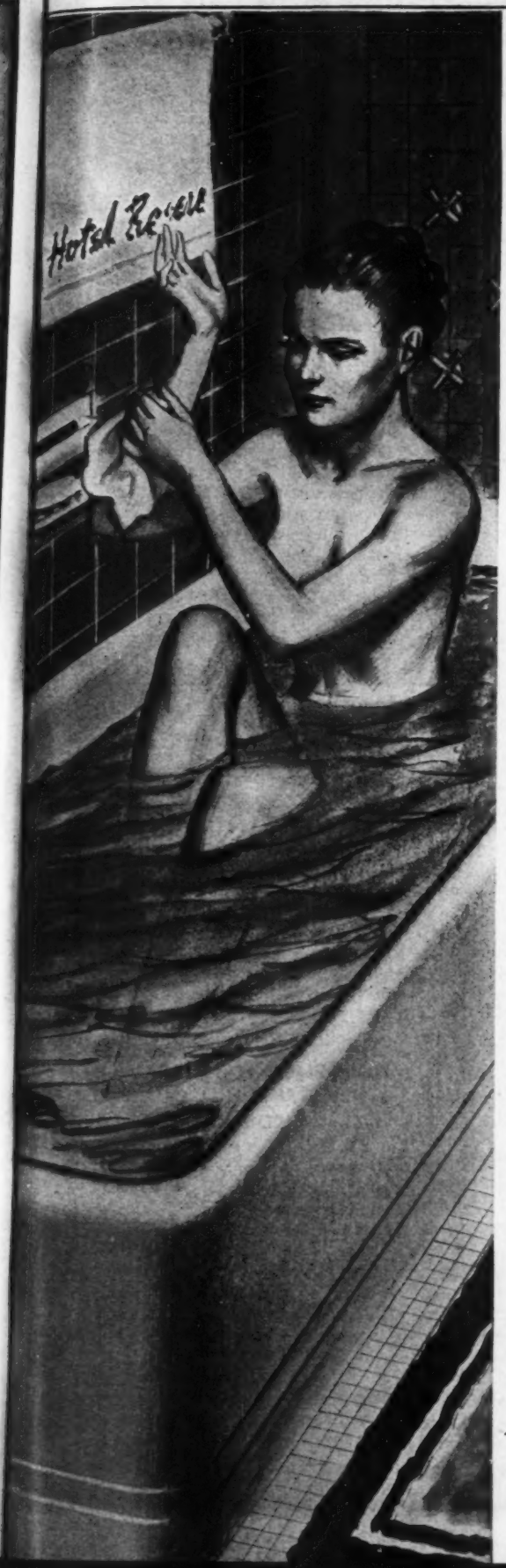
"Development of a pulpwood, post and pole industry simultaneously would permit a stimulation cutting on millions of acres of old growth lodgepole pine that are now stagnated so mortality equals growth," he declared. "Several hundred thousand cords of wood that would otherwise die a natural death can be harvested on a partial cutting basis from three million acres of younger lodgepole pine stands. Over one million acres of larch timberland is less than 120 years of age. This is another source of several million cords of pulpwood removed on a thinning basis before mortality overtakes it.

"Yes, this industry could be expanded to 100,000 cords by the end of 1947. Future expansion would, of course, depend on competition from mills that may be established in western Montana and northern Idaho.

"There is room for at least 200 tons daily of sulphite mill capacity and at least 600 tons of sulphate capacity, without seriously interfering with timber supplies of existing wood-using industries."

This year a number of individuals representing Lake States mills were traveling about in Montana to look into possibilities of further large scale production of pulp logs for shipment east. They were talking in annual production volumes ranging from 50,000 to 750,000 cords.

PAPER · · · America's 6th Industry



WASH CLOTHS MADE OF PAPER

(NEWS ITEM: *Twenty hotels are now supplying guests with individual wash cloths made of paper.*)

Wash cloths made of paper are finding a ready market in America's leading hotels. Every room is supplied with soft and gentle wash cloths at a considerable reduction in overhead. And there is no laundering expense.

This new paper is being used in homes for washing dishes, washing windows, washing enamelware and electric stoves, waxing floors and even for back-rubs. It is unaffected by boiling water. Perforations in the cloth help to increase suds and prevent a squirting effect when squeezed.

Paper sheets and pillow cases . . . paper draperies . . . paper covered steel core . . . paper tape for recording sound . . . new uses for paper calling for new standards of lightness and toughness, new standards of quality in performance. New responsibilities—new opportunities for the Pulp and Paper Industry.

The Puseyjones Organization is now devoting itself completely to the design and construction of Paper-Making Machinery built to new high standards of speed and efficiency, and to the modernization of existing machines.

Among the new machines under construction by Puseyjones are three of the largest and fastest Fourdrinier Machines, one for book and high grade printing papers, one for white paper for bags, and one for Kraft liner board; also one Cylinder machine of record size and speed for the manufacture of floor covering felt. Other machines are under construction for the manufacture of M. G. Kraft specialties, facial tissues, and high grade bristols.

Puseyjones Engineers will welcome the opportunity to work with you in solving production problems.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U. S. A.

L. E. O'Neil, of the Forest Products Company at Kalispell, a Western Pine Lumber producing firm, tells how his operation went into the pulpwood business as a side line.

"Our interest in it," he recalled, "grew from a serious blowdown of spruce timber on a parcel of state land which we were logging. A heavy windstorm hit just after we had harvested the mature timber in this stand. It strewed the ground with hundreds of cords of small spruce and balsam trees which had been left to grow. The area looked as if a giant hand had scattered matchsticks over it.

"We didn't like to see this material go to waste so we started picking up and loading it out in pulpwood lengths, with our own regular crews when they were idle due to breakdowns, car shortages or other delays. In this way we cut quite an amount of pulpwood with existing labor and equipment.

"Gradually we worked up a business in similar material with other owners of trucks and land, largely farmers working in spare time. They clean up so-called forest waste from their own and other lands. They haul much of it in winter time when they have the time, and occasional loads in summer when they come to town for supplies.

"Since some of these choice pulp species are not in much favor for firewood and formerly were simply burned on the ground when land was cleared, their use for pulp is a definite saving of raw material as well as providing extra income for farmers and helping in the general economy of this region. The added income makes itself felt among the townspeople and provides more tonnage for the railroads."

As an indication of how the industry has taken hold, O'Neil's company now lists about 400 small pulpwood suppliers. Almost all are farmers.

Eastern Montana shares in the new trade, too. Two Wisconsin mills are getting pulpwood from an integrated pole - sawlog - pulpwood development near White Sulphur Springs. This operation is located in the Little Belt mountains in Lewis and Clark national forest. Pulpwood is almost entirely lodgepole pine, with spruce and alpine fir in negligible quantity. The haul from there is some 1,200 miles.

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ST. REGIS PAPER COMPANY INCREASES CAPITALIZATION

Stockholders of the St. Regis Paper Company approved an increase of $25,000,000 in the company's capitalization on September 18. The increase will be covered by the issuance of 250,000 shares of new first preferred stock. At present the St. Regis authorized capital stands at $72,027,000.

R. K. Ferguson, president of St. Regis, told stockholders that a part of the new stock flotation will be marketed immediately to produce funds for the retirement of present preferred stock and to acquire additional properties and to expand production facilities. The remainder of the flotation will be issued at the discretion of the board of directors.

Mr. Ferguson further stated that the increase in the company's business has made expansion expedient. He estimated that net sales this year would aggregate $75,000,000, and with net profit placed at $5,000,000 it is hoped that resumption of dividend payments on 7,495,714 shares of common stock can be made. However, Mr. Ferguson made it clear that no common stock disbursements would be made until there was assurance that dividend payments could be a continuous practice. The last common stock dividend was paid in October 1931.

◆

INCREASE GUAR PRODUCTION

Construction of new Sperry plants at Lodi and Los Angeles, California, to develop guar as an aid to the paper, food, and textile industries has been undertaken by General Mills. The construction of the plants climaxes three years of research and experimentation by General Mills' engineers.

Guar was chosen by the Institute of Paper Chemistry (Cf. P. I. & P. W., Dec. 1945) as a domestic substitute for locust beans, obtained from a pod bearing plant of the Mediterranean area. When the source of supply of locust beans was cut off by World War II, guar was subject to much experimental research.

General Mills predicts a new higher yielding, earlier maturing variety of guar resulting from continuing research. Since the crop now requires a long growing season and is highly sensitive to frost, it is limited to the agricultural areas in the irrigated region of the southwest.

◆

FINAL PLANS FOR ALABAMA NEWSPRINT MILL CALL FOR A COST OF $18,000,000

Final plans for a newsprint mill for the South were announced September 30 at the annual meeting of the Southern Newspaper Publishers' Association held in Edgewater Park, Mississippi.

The first announcement of the plant, which will be located on the site of a former ordnance plant at Childersburg, Alabama, called for an expenditure of $10,000,000 (Cf. P.I. and P.W. April, 1946). According to the plan just announced, the mill will produce newsprint from southern pine; it will have a capacity of 100,000 tons a year, and the estimated cost now stands at $18,000,000.

ST. REGIS BUYS THREE MILLS FROM TIME INC.
Bryant — Hennepin — Maine Seaboard

▶▶▶ NEGOTIATIONS between Time Inc. and the St. Regis Paper Company culminated on October 10 with the announcement that Time had sold to St. Regis the following mills: Bryant Paper Company, Kalamazoo, Michigan; Hennepin Paper Company, Little Falls, Minnesota; and Maine Seaboard Company, Bucksport, Maine.

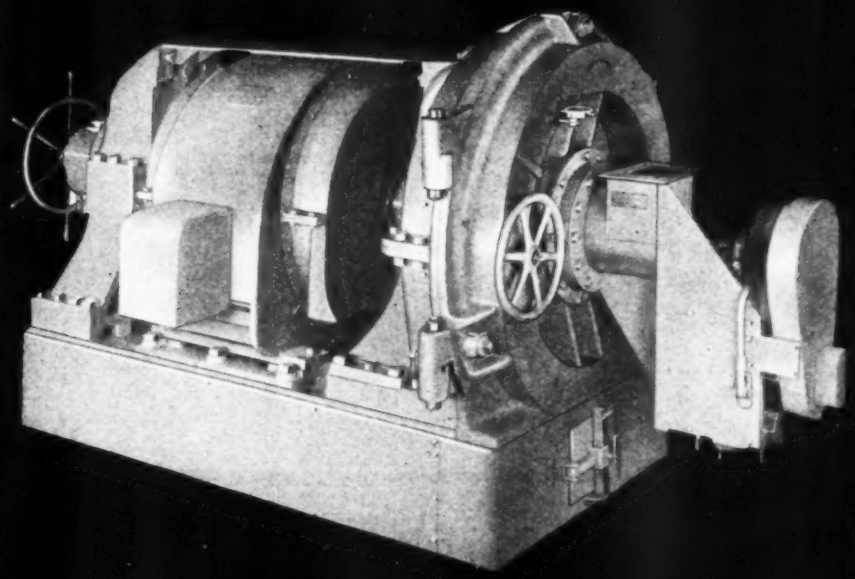
The three mills, which have an aggregate capacity of approximately 180,000 tons per year, were purchased by Time Inc. during 1945 (Cf. P.I. and P.W. March, Oct., and Dec., 1945). During its period of ownership, Time Inc. has developed programs at these mills to improve the quality of paper which will add considerably to the annual supply of book paper in the United States.

St. Regis has been operating two of the foregoing mills—the Hennepin and Maine Seaboard—under management contract since January 1.

With these developments, Time Inc. has entered into negotiations with the St. Regis Paper Company not only for the sale of the three mills, but for a substantial supply of paper under contract, in line with Time's policy of purchasing, in so far as possible, its major requirements of paper from independent mills.

The St. Regis Paper Company is now one of the largest producers of paper in the United States. It has plants in 13 cities in this country, also in Canada, Brazil, and Argentina.

Since Time Inc. purchased the Bryant mill in March, 1945, a huge program of expansion and modernization has been in progress. First of these improvements was a new power plant which cost around one million dollars. A new water filtration plant is now almost completed. However, the new coating mill and graphic arts laboratory which were a major part of the expansion program at Bryant were not sold along with the plant but have been retained by Time Inc. The development of a research program and operation of the coating mill will be carried out by that organization as originally planned.



A relative newcomer . . . the new, improved Sprout-Waldron 36-2 Refiner has proved outstandingly efficient and economical in the pulp and paper field.

Capable of all operations from a straight defiberizing program to the actual refining of already processed fibers for fine papers, the Sprout-Waldron 36-2 Refiner is particularly well adapted to the following applications:

1. Reducing semi-chemical pulp chips in stage operation to finely divided fibrous form.
2. Reducing groundwood rejections.
3. Reducing sulphite and kraft knots and tailings.
4. Processing kraft pulp on cycle for condenser papers.
5. Professing flax pulp on cycle for cigarette papers.
6. Processing sulphite pulp on cycle for glassine and waxing papers.

SPROUT-WALDRON & CO.

Manufacturing Engineers

MUNCY PENNSYLVANIA

Marathon Builds a Mill and a Town

in a Canadian Wilderness

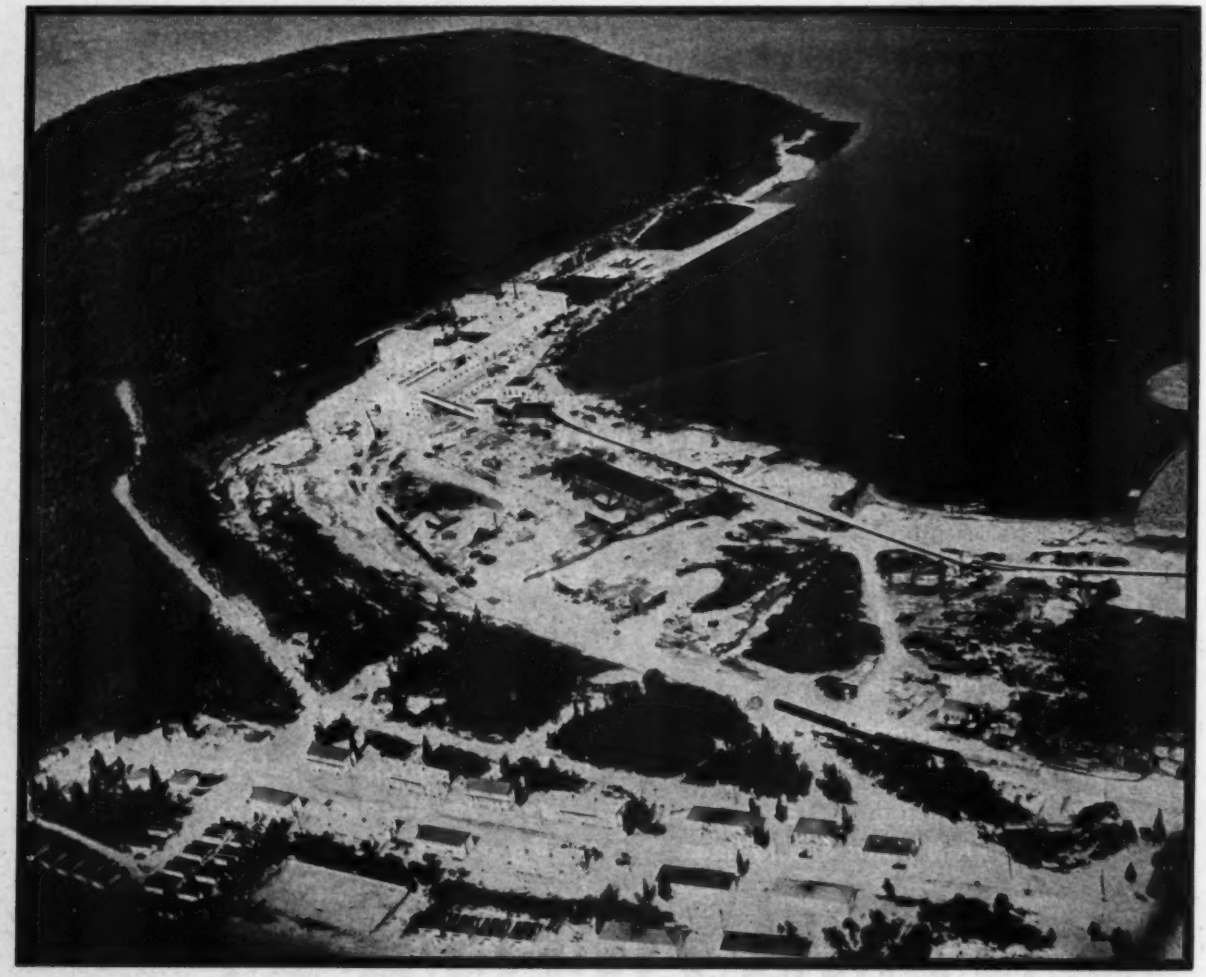
▶▶▶ A MILL AND A TOWNSITE have been built on the main line of Canadian Pacific Railway, about 600 miles west of Toronto, Ontario and approximately 180 miles east of Port Arthur, Ontario. The station was formerly known as Peninsula, Ontario—the town is now called Marathon, Ontario, Canada.

The mill and town were built by Marathon Corporation (Rothschild and Menasha, Wisconsin) through its subsidiary company, Marathon Paper Mills of Canada, Ltd., which organization also directs the company's pulpwood cutting operations in Canada. Construction on this great project began in the spring of 1944 and continued without interruption.

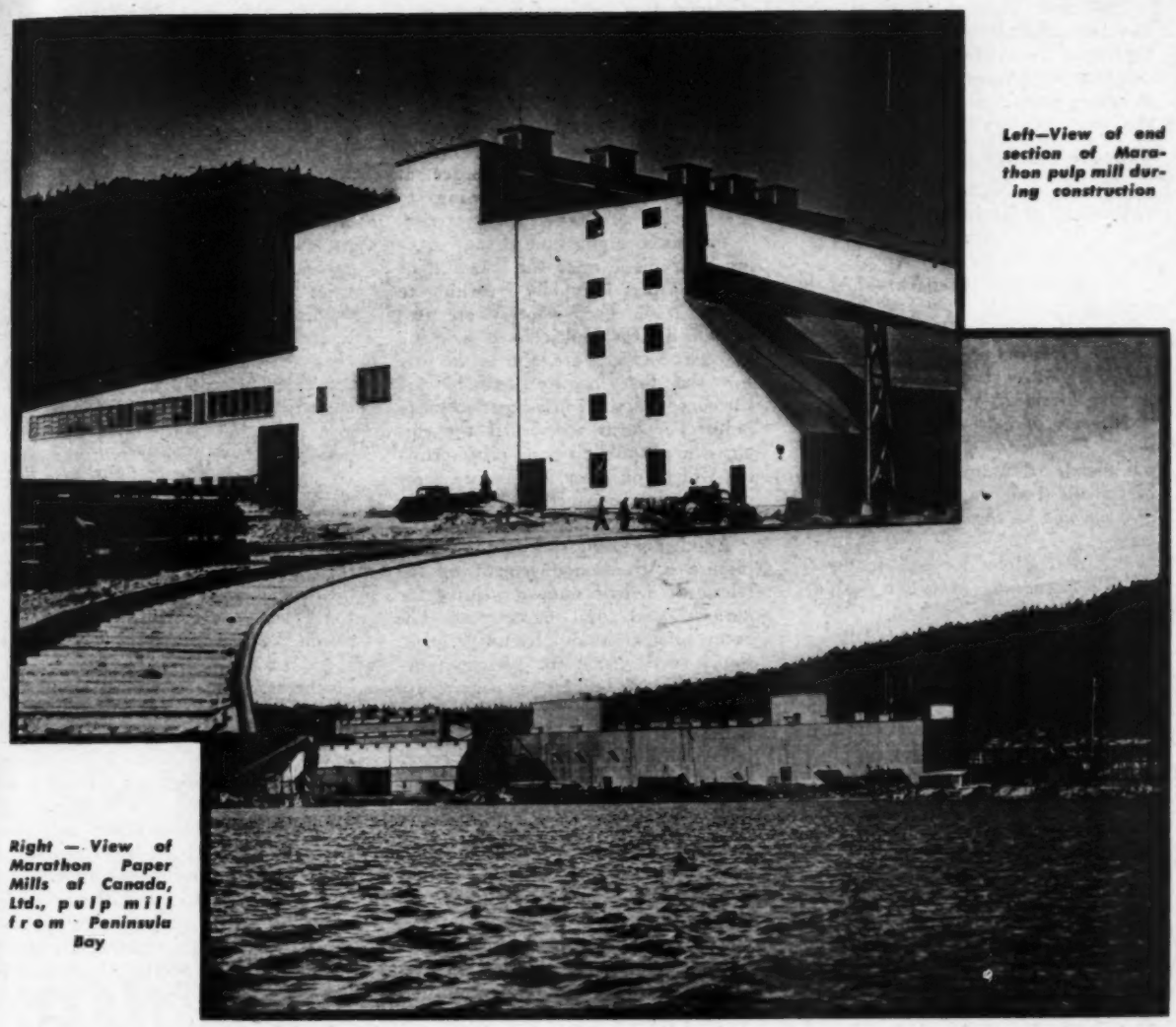
The new mill manufactures high-grade bleached sulphate pulp and has a capacity of 300 tons per day. The mill building itself is 660 ft. by 188 ft. The pulp storage building which adjoins it is 440 ft. by 204 ft. and leads to a 480-ft. dock. The entire pulp-making operation is housed under one roof, making possible highest operating efficiency. General plant offices and laboratory are housed in the mill building. The mill is located on a sheltered peninsula of Lake Superior which forms one of the finest harbors on the north shore.

The plant dock will accommodate the largest freighters. The mill has seven digesters of 3,260 cu. ft. each. The mill building is constructed of concrete steel and corrugated asbestos siding. The Foundation Company of Canada was the general contractor; Stone and Webster Engineering Corporation was consulting engineer and construction supervisor.

The wood supply for the new pulp mill is cut from the company's Pic River and Algoma Townships concession, an area of approximately 2,700 square miles. The spruce, jackpine and other suitable wood for sulphate pulp-making by chemical process is driven down the Pic to Lake Superior at a point about 10 miles east of the mill. It is towed by boom to Peninsula Harbor and taken from the water to slasher and barkers. From stockpiles along the bay front, the wood is auto-



Aerial view of pulp mill and a section of the town site of Marathon, Ontario



Left—View of end section of Marathon pulp mill during construction

Right — View of Marathon Paper Mills of Canada, Ltd., pulp mill from Peninsula Bay

D. C. Everest, president of Marathon Corporation and chairman of the board of Marathon Paper Mills of Canada, Ltd.

matically conveyed by conveyor belts to the chip building and from there to the chip storage.

A complete town was built in the wilderness at the site of the mill. The town of Marathon will have a population of about 2,500 people. Plans call for 245 dwelling units including single-family, two- and four-family homes and dormitories, many units of which are now in use or ready for occupancy.

Erected and in use are a modern hotel, a three-story hospital, completely staffed, a school, complete from kindergarten to tenth grade, a bank, department store, and a new railroad station.

Now under construction are a fire-police headquarters, a movie theater and recreation center. Town-site planners have followed the natural contour of the peninsula on which the town is built in laying out attractive streets, courts, and home site. *(Turn page)*

John Stevens, Jr., president of Marathon Paper Mills of Canada, Ltd.

The first digester blow of unbleached sulphate pulp was made on September 20, 1946. Production will continue in increasing volume and the bleaching plant will be in operation by the time this story is read.

Executive Staff

Officials of Marathon Corporation (Menasha and Rothschild, Wisconsin) are:

President—D. C. Everest

Executive Vice President—Leo E. Croy

Vice President—John Stevens, Jr.

Vice President in Charge of Manufacturing—Roy J. Sund

Vice President—Allen Abrams

Director of Sales—Donald A. Snyder

Officials of Marathon Paper Mills of Canada, Ltd. are:

Chairman of the Board—D. C. Everest

President—John Stevens, Jr.

Vice President (Mill Div.)—Niles M. Anderson

Vice President (Woodlands Div.)—H. P. Klinestiver

Secretary-treasurer—F. P. Johnson

New mill operating executives include: James Ruck, operating manager; Grant Ross, chief engineer; Dr. F. Kraft, technical director.

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BRITISH PAPER NOTES
(August, 1946)

▶▶▶ A slight upward movement in paper prices has been granted by the publication of a new Paper Control order (No. 76). This affects only the tinted esparto (straw) papers, Massey Process coateds, with bleached straw, bleached soda wood pulp or esparto base, and photographic base papers. Accompanying these advances are small reductions in the prices of some boards (not printers' boards) and gray paper felt.

With the small quantities of esparto grass arriving, straw remains the most important and easily obtainable substitute. In confirmation of the government's statement that the quantity of esparto grass to be imported will be low for this year, arrangements have been made for the continuance of the purchase of straw from the farmers in England and Scotland at the established price of £4 per ton, free on rail or delivered mill, plus the merchant's margin.

Since these arrangements were made, however, some news of a more reassuring nature has arrived from Algeria and Tunisia, and it is anticipated that the imports of esparto grass may reach 100,000 tons for the present year. This compares with 330,000 tons imported annually before the war. Although first consignments were of a mixed character, having been stocked for a number of years, it is expected that this autumn's gathering will be up to prewar standard. Supplies already arriving at the mills are being cleared quickly to make room for further deliveries, storage space at present being restricted owing to heavy loads of straw being carried.

The initial supplies are already making their mark since the standard of esparto papers is rapidly returning to prewar level. These papers were used extensively for multicolored printing by offset and gravure, also as the base for the best quality coateds and chromos, and, since it is expected when industry returns to normal the emphasis in all publicity and other printing will be on color, the future prospect of esparto papers is particularly bright.

Another pleasing spot in the British picture is the announcement of the release of a little more newsprint for national and local newspapers. The extra allocation is extremely small, but it will enable the present four-page dailies to become six pages every alternate day. The most interesting feature of the announcement is that for a trial period the number of copies produced daily will not be restricted. Thus, after seven years of restriction, each newspaper will be able to find its true reader interest level. As the non-sale-or-return clause will continue to operate there will not be any wasted copies. Also, as "stunt" circulation raising schemes are prohibited the revised scales of sales will rest entirely upon journalistic merit. It is possible that the shifting of circulations may prove a barometer of the present government's popularity after fifteen months in office, especially following the bread rationing fiasco. Discussions are in progress with a view to allowing periodicals an increased quota.

According to the latest monthly *Digest of Statistics*, (a government publication which has been issued since the end of the war) covering the month of May, Great Britain is producing paper and boards at the rate of 1,856,920 tons per annum and importing at the rate of 271,860 tons. This compares with a prewar production of approximately 2,600,000 tons and an importation of 1,000,000 tons. Thus, Great Britain is now producing at the rate of 70 per cent.

That the British paper trade is gradually moving forward is disclosed by the board of trade returns for the first seven months of the year. An appreciable rise in the imports of paper and boards is noted for July as against the previous month. Exports show a similar trend, but imports of materials have declined. Noted among the increased imports is newsprint, over 10,000 tons of which arrived in July. The total of these imports for the period January to July this year was 164,145 tons or just over 26 per cent of prewar importation and included among these imports for July, for the first time since 1940, were strawboards from Holland. With her exports of paper and boards Great Britain has supplied, so far this year greater quantities than in 1938 to nearly all her exporting countries but heavy adverse figures are shown against Australia, New Zealand, and the Union of South Africa. The total exports to these countries since January is 14,510 tons against 61,987 tons during the same period of 1938. Imports of materials are barely 45 per cent of prewar, but the cost of these materials is 110 per cent up, compared with 1938.

After fifteen years of initial progress, during which period they lost their premises during the London Blitz, the Printing and Allied Trades Research Association has at last secured a site for its new research center at Leatherhead, Surrey. The new building will cover an area of 25,000 square feet. The basement will house the heavy machinery and will contain printing, packaging, and packet testing machinery which will be run by practical operatives. There will also be a constant humidity laboratory where paper testing will be undertaken among other work, and the printing properties of paper will receive special attention. Eighty thousand pounds will be expended on this building, and it is hoped that it will be ready for use next year.

Meanwhile, there seems to be every possibility that there will be labor troubles in the printing trade in the near future. Printers are demanding a 40-hour week, a fortnight's vacation annually with pay, and the banning of overtime. The latter has already been introduced, and this, coupled with the shortage of manpower and materials, is already causing lateness in the publication of many journals. Negotiations are in progress and it is reported that only one hour in the working week separates the British Federation of Master Printers and the Printing and Kindred Trades Federation, but both sides appear at the moment determined not to give way. A strike by this Federation will call out the paper merchants' warehousemen as they are members of this Union.

Paper Trade in Europe

Midst the disturbed state of Europe and all the political headaches which confront the various national leaders the Paper Trade is gradually reviving.

Becco has developed a groundwood bleaching system which is economical and simple to operate.

Years of experience gained by bleaching of all types of cellulosic materials with hydrogen peroxide, and knowledge obtained through intensive research and development work in the bleaching of groundwood is yours for the asking. Write to:

BECCO SALES CORPORATION

AGENTS FOR BUFFALO ELECTRO-CHEMICAL CO., INC.

20 Sawyer Avenue, Buffalo 7, N. Y.

New York Boston Philadelphia Chicago Charlotte

This process at the beginning must of necessity be extremely slow but it is hoped that the effort will quickly become cumulative.

Unhappily the coal situation in Great Britain is assuming an extremely serious aspect and many industries are facing the coming winter with apprehension. Despite Nationalization, extra rations to the miners and continual publicity stressing the urgent need for more coal the output declined practically every month. It is suggested that among the root causes of this decline is the heavy income tax which renders the effort for extra pay packets useless, and the lack of consumer goods which negatives any desire to earn more money.

This decline in coal production and almost absence of exports affects production in *Norway* and *Sweden*. To those countries Great Britain forwarded regular supplies of coal in prewar days. Sweden is practically in a position to return to prewar production but for this lack of coal and although she is reported to have received small supplies from Poland some paper plants are turning over to oil fuel. Meanwhile valuable timber is being used for fuel.

Norway, despite many years of occupation, managed to reach 20 per cent of prewar export by the end of 1945. The rationing of paper and pulp is being continued in this country in an effort to aid exports but so far this year Norway's exports to Great Britain alone have reached only 17 per cent of prewar. In a further effort to increase the production of wood it has been decided to employ 15,000 German prisoners but it is believed that this decision has been reached too late to affect this year's output. Latest reports state that production of pulp is only 35 per cent of capacity.

Finland, too, is making every effort to increase production and the annual timber cutting program for 1946-47 steps up production of pulpwood from 9.25 million cubic meters to 13.5 million cubic meters. Although the actual increase in all types of timber is raised only from 52 to 53 million cubic meters the extra pulpwood is scheduled to be obtained by a reduction in fuel wood.

No very late news has been received from *France* apart from the fact that the industry was practically undamaged by the war but towards the end of last year an appreciable additional allocation of coal was granted to the industry. From Holland comes news of an optimistic nature but here again the decline in coal production is a serious factor coupled with the scarcity of labor in the mines. In prewar days Holland received supplies of wood regularly from Russia, Sweden and Finland; countries which today are extremely hard pressed.

The paper trade in *Germany* is in a serious position. From the British zone comes news that of 170 paper mills producing 1,000,000 tons annually before the war only 150 are capable of work and of these only 40 are actually working. A production figure of 10,000 tons in January fell to 8,200 tons in March again due to a shortage of coal. Supplies of wood pulp are urgently required but the timber producing areas are in the American and Russian zones. Local supplies of timber will not be sufficient to enable this year's target of 480,000 tons being reached.

The latest reports from *Soviet Russia* stress the losses through the war but conclude with the significant statement "That by the end of 1945 a great many of the incapacitated paper plants were restored." It is also stated that efforts are being made to supply these restored plants with 4,500,000 cubic meters of pulpwood during the 1945-46 season "as compared with the 800,000 cubic meters received in 1943." Added to this it has to be remembered that Soviet Russia now controls the Baltic States which were heavy exporters of paper and pulpwood in prewar days. Doubtless the Russian paper trade is in a serious position but, nevertheless, early future movements by Russia are an unknown factor.

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KIMBERLY-CLARK PROGRESS SINCE V-J DAY REVEALED AT WEEK-LONG SALES MEET

A full report on Kimberly-Clark Corporation's expansion program—in progress since V-J Day—was unfolded at a week-long general sales meeting just concluded at Neenah, Wisconsin, headquarters, revealing a greatly expanded production goal for pulp, paper and cellulose wadding, approximately twenty-five per cent above immediate postwar output. All sales divisions were present and heard top officials of the corporation speak on "Eighty Years of Kimberly-Clark Production" with the emphasis on six years still to come.

The theme of the 1946 sales meeting was emphasized in opening remarks of welcome by J. R. Kimberly, vice president in charge of sales, who said that the corporation—while still selling on an allocation basis—was well along in an expansion program of a magnitude not duplicated in the corporation's seventy-four year history. He said that "our purpose this week is to show you local progress first-hand, show you pictorially other segments of the programming and tell you about them. For the assurance you can bring to the Kimberly-Clark customer that we are a production source not only to be depended upon today but increasingly so in the years ahead."

Present conditions affecting Kimberly-Clark were discussed by Ernst Mahler, executive vice president. He commented that the program of growth and modernization would further readjust corporation manufacturing needs of the day. Mr. Mahler also pointed out to the sales organization that the corporation's new technical center would be formally opened within a month; that it reflected Kimberly-Clark determination to hold technical leadership in the industry, and was typical of the type of product support which the sales department could expect.

"Yours is a big responsibility," Mr. Mahler said. "Steady operation at Kimberly-Clark, through good times and bad, would not be possible without your help. Nor will it be possible in the future. More broadly speaking, the fact that we have achieved in this country a higher standard of living than will be achieved anywhere else in the world during the next century owes a good measure of appreciation to the responsibility which successful selling, of which you are a part, has fully assumed." Mr. Mahler returned to the corporation last fall after nearly twelve months in government service, largely overseas as consultant to the war department on paper manufacturing programs and as industrial adviser to the Inter-Allied Reparations Commission.

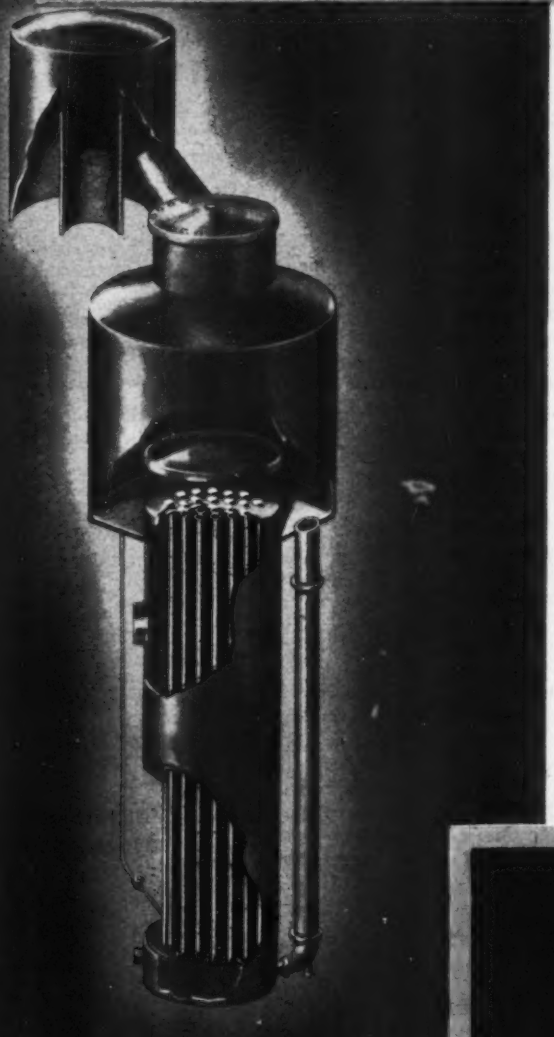
Mr. Mahler said that he felt salesmanship will never be more important than in the next five years. "Goods well made must be well sold and that means selling the corporation back of the product as well as the product. There is a new era ahead for you and one in which you should have faith."

Specific components in the expansion program, cited by H. G. Boon, vice president in charge of operations, included the following:

1) The corporation's new subsidiary at Terrace Bay, Ontario, the LongLac Pulp and Paper Company Limited. This project involves a complete townsite and a modern chemical pulp mill planned to produce 300 tons a day of bleached sulphate. The mill is expected to go into production in the latter part of 1948 and is thus far on schedule.

2) A modernization program at the Niagara, Wisconsin, mill that represents the corporation's largest ex-

Timken 5% Nickel Alloy Tubes
SERVE LONGER
in Black Liquor Evaporators . . .



From laboratory studies, and investigations and testing under actual plant conditions, in many northern and southern mills during the last 8 years, Timken has developed 5% Nickel tubes which meet specific black liquor corrosive problems for greatly improved life-over-cost.

No other steel producer has devoted so much research to physical requirements necessary to expedite installation and assure maximum service. Studies have included causes of general corrosive attack and pitting in actual service where black liquor concentrations run over 40% solids, where liquor temperatures exceed 220 degrees F., where sulphidity of cooking liquors exceeds 25%, and where forced circulation evaporators have had thru-put increased by larger pump installations.

Timken 5% Nickel alloy tubes have uniformity of structure and are given flaring and hydrostatic tests at 1,000 lbs. per square inch.

A Timken specialist will bring you recommendations. Write Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

★ YEARS AHEAD — THROU[GH] EXPERIENCE AND RESEARCH

SPECIALISTS in hot rolled and cold finished Alloy Steel Bars for forging and machining applications, as well as a complete range of Stainless, Graphitic and Standard Tool Steel analyses. Also Alloy and Stainless Seamless Steel Tubing for mechanical and pressure tube applications.

pansion in the book paper field in a quarter-century. The foundation is complete but is three months behind schedule, postponing a production increase until early 1948.

3) Work on an addition to the Lakeview mill at Neenah has been completed but production from a new creped wadding machine will be delayed until the first quarter of next year.

4) The new Memphis (Tenn.) mill, acquired from the Government, is being reconverted on schedule; the first of two machines is scheduled to begin operation sometime in the second or third quarter of next year.

5) Work has been completed on a new plant established at Kimberly, Wisconsin, for the development of new products. The audience also heard of the progress of equipment modernization taking place at all mills of the corporation.

The week-long program of outlining what the corporation is planning for the future was designed and planned by C. F. Jenkins, general sales manager.

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BOWATERS' ANNUAL TARGET 300,000 TONS NEWSPRINT

An expansion program scheduled for completion by early 1948 will boost to approximately 300,000 tons the annual production of newsprint manufactured at Bowaters' Newfoundland Pulp and Paper Mills Limited, Corner Brook, Newfoundland, plant; and production of sulphite pulp will exceed 50,000 tons. Operating at new capacity throughout 1945, the mill output was over 186,000 tons of newsprint and groundwood pulp production for export 7,300 tons. Sir Eric Bowater, president of the company, who recently inspected the Corner Brook plant, has stated that the entire production of the mill has been contracted for ten years.

To supply the increased needs of the mill at Corner Brook, as well as the Bowaters' Kemsley mill in England, an annual cut of 600,000 cords of spruce and balsam fir pulpwood must be maintained. Achievement of this record cut will require increased logging facilities and establishment of many new camps, and, as well, improvements must be made in cutting, handling, barking, stacking and shipping.

Major factor in the mill expansion program will be the installation of a high speed newsprint machine which has already been contracted for delivery by the Dominion Engineering Company during the late autumn of 1947. The new machine, the sixth in the plant, will operate at the rate of 1,750 feet per minute and produce a sheet of 266 inches trim width. This machine alone will not provide facility for meeting the stepped-up production schedule, the five existing newsprint machines with speed ranges from 800 to 1,200 feet per minute will operate at speeds necessary to produce an additional 15,000 tons a year; and the capacity of the sulphite pulp machine will be geared to produce an increased difference of 55,000 over 40,000 tons of baled pulp yearly. Orders for most of the heavy machinery and equipment have been placed with manufacturers in the United States, Canada, and the United Kingdom.

New buildings will be erected to accommodate the new machines and equipment. Older buildings will be demolished and replaced by new structures. Among the buildings to be erected to house new equipment, a new grinder building will be built, a new power substation, a new large machine room, and new additions to existing buildings handling groundwood pulp.

Beyond the mill proper, the expansion program calls for increased sulphur storage space and new sulphur handling equipment and installation of bark disposal equipment. Extensive changes in mill electrical equipment are necessary and will be made as part of the program. Expansion of woods operations will be undertaken, with improvements made in the handling of logs from woods storage locations to the barking barges and log booms on the larger rivers and lakes.

Despite shortages of equipment and supplies this past year, production at the Bowaters mill has increased. A few weeks ago a daily production rate of over 700 tons of newsprint was established. Following recent wage increases to employees, another one million dollars was added to the payroll. When the additional facilities called for under the expansion program are in operation, an additional 150 men will be employed to operate the new machine, and more than a thousand men will be given permanent employment in the woods operations.

Total cost of the mill expansion program together with increased logging operations will approach $10,000,000 which will be spread over a two-year period.

◆

ST. JOSEPH'S COLLEGE AGAIN OFFERS PAPERMAKING COURSE

Beginning October 14, and meeting each Monday and Thursday evening, The Evening School of Papermaking will hold semiweekly sessions at St. Joseph's College, Philadelphia. The course has met with considerable success during the past three years it has been offered.

A complete curriculum of instruction covering the theory and practice of papermaking and paper converting will be presented. Specific lectures pertaining to pulp preparation, paper chemistry, operation of process machinery, paper sizing, paper coating, and printing processes and printing inks will be given. The faculty will be made up of men prominent in the industry.

◆

Washington News

▶▶▶ THE UNATTRACTIVE ceiling prices for paper desired by Government agencies, particularly the Government Printing Office, has prevented domestic mills from bidding for the government requirements, with the result that Public Printer Giegengack is again talking of the need for building a government mill. When recent bids were opened offerings totaled only one-third of the quantity of paper required for fourth quarter operations. The red tape involved in contracts with the government has been another factor discouraging manufacturers from bidding for this business.

◆

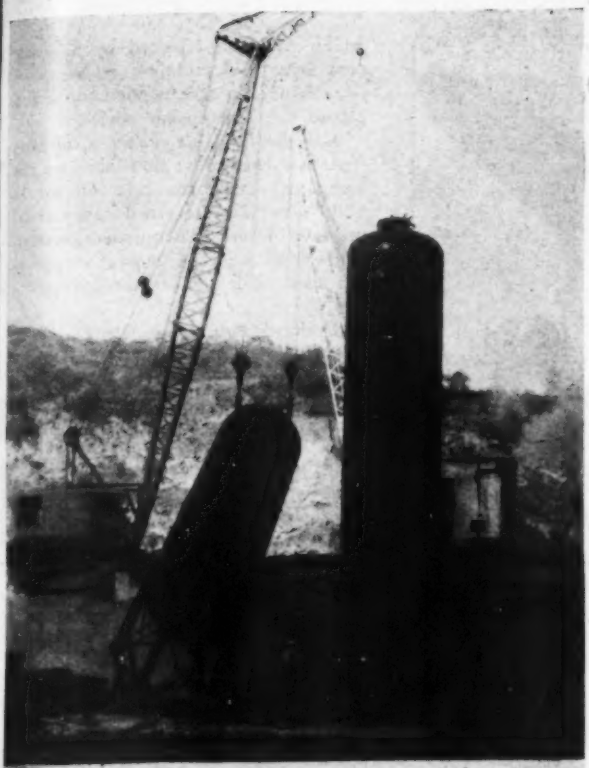
▶▶▶ APPROVAL BY THE CPA has been granted to the Southern Kraft Division of the International Paper Company for a $239,000 addition to be made at the Camden, Arkansas, plant. The application for expansion stated that the new adition will make possible an increase of 51,000 tons on the mill's output of pulp.

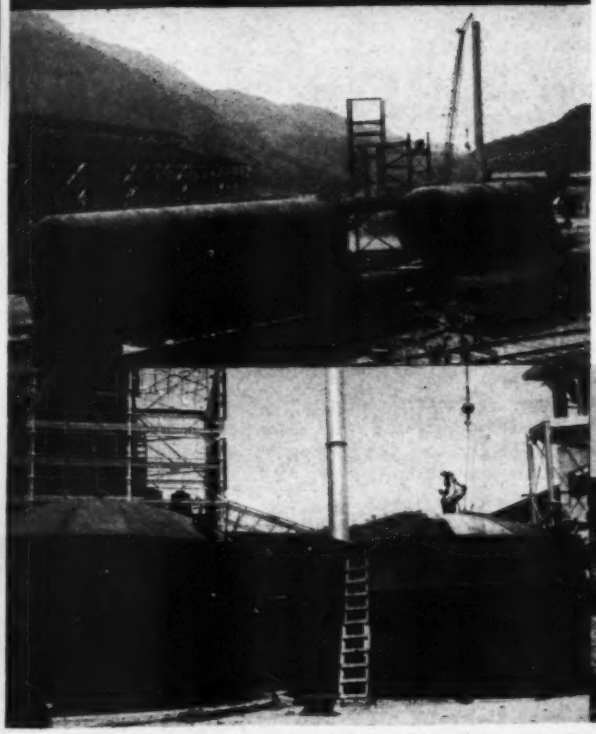
◆

OPA BOOSTS NEWSPRINT CEILING $10 PER TON NEW BASE PRICE IS $84

An increase of $10 a ton in manufacturers' ceiling prices for newsprint was announced by the OPA on October 11. However, the Administration refused to decontrol it as requested by newspaper publishers. It was stated that the decontrol plea was under study, but the price increase was granted "to assure that United States publishers will continue to receive maximum possible shipments of newsprint."

The increase applies to all newsprint sold in the United States, both domestic and imported. The new ceiling for standard newsprint delivered to 38 port cities will be $84 a ton. Ceilings for deliveries in 10 zones are specified in line with trade practices.





GROUNDWORK *for efficient* PULP *and* PAPER MILL *Operation!*

★ In the pulp and paper industry, as in many other industries, the groundwork for efficient operation is laid when new mills are planned. Equipment designed specifically for the job and fabricated by skilled workmen, can also be the determining factor in how efficient a mill operates.

These construction views show some of the digesters, steel tanks and bins we fabricated for a new 150-ton kraft mill being built in Mexico. They include chip tanks, liquor tanks, oil tanks, measuring tanks, blow tanks, foam tanks, dissolving tanks, hot water tanks, salt cake bins, condensate receivers, lime bins, accumulators and other steel plate structures.

Whenever you need equipment of this type, write our nearest office for quotations.

Upper Left and Left: These views show the two 9-ft. 6-in. diam. by 40-ft. sulphate digesters arriving at the mill and being erected. The posts which support these digesters were attached to them at our plant.

Lower Left and Below: These photos show some of the various steel tanks we built for the Mexican mill. Among the twenty-five tanks were lime storage tanks, black liquor tanks, hot water tanks and dissolving tanks.

CHICAGO BRIDGE & IRON COMPANY

Chicago, 4 ..... 2445 McCormick Building
New York, 6 ..... 3350-165 Broadway Building
Cleveland, 15 ..... 2267 Guildhall Building
Los Angeles, 14 ..... 1459 Wm. Fox Building
Birmingham, 1 ..... 1511 North 50th Street
Atlanta, 3 ..... 2143 Healey Building
Tulsa, 3 ..... 1651 Hunt Building
Houston, 1 ..... 5643 Clinton Drive
Philadelphia, 3 .... 1653-1700 Walnut Street Building
Washington, 4 ..... 703 Atlantic Building
San Francisco, 11 ..... 1217-22 Battery Street Building
Detroit, 26 ..... 1566 Lafayette Building

Plants in BIRMINGHAM, CHICAGO and GREENVILLE, PENNA.
In Canada: HORTON STEEL WORKS, Limited FORT ERIE, ONT.

FIRST RECLAMATION YEAST PLANT TO BE LOCATED AT RHINELANDER PAPER CO.

Subsequent to the organization of a group of Wisconsin mills for the purpose of building reclamation yeast plants utilizing waste sulphite liquor, plans have now been formulated for the first mill to be built in line with this program (Cf. P.I. and P.W. August, 1946).

An organization incorporated as the Lake States Yeast Corporation will erect a $400,000 plant on the premises of the Rhinelander Paper Company, Rhinelander, Wisconsin. Plans are being prepared by Stone and Webster Engineering Corporation, Chicago, and construction will begin as soon as possible.

This project has developed from a research program started in 1939 by a group of sulphite pulp producers in Wisconsin and Michigan. Officials of the new corporation are: President, Folke Becker, Rhinelander Paper Company; vice president, Stanton Mead, Consolidated Water Power and Paper Company, Wisconsin Rapids; and secretary-treasurer, John G. Strange, of the Institute of Paper Chemistry, Appleton.

◆

AIR MAIL RATE TABLES PREPARED BY ECUSTA

For the convenience of its paper merchant customers, the Ecusta Paper Corporation, Pisgah Forest, North Carolina, has issued the following tabulation showing the number of sheets of Ecusta writing and air mail paper which can be mailed for five cents, the new domestic air mail rate which became effective October 1:

Ecusta Letterhead Substance	No. 8½x11 sheets per ounce including No. 10 envelope
7½	13
9	11
11	9
13	7
16	6
20	5

These tabulations were prepared with hairline accuracy. The No. 10 envelope used was made of 20 substance paper.

◆

FINANCIAL

The widespread break in the stock market had a depressing effect on paper mill securities, even though they did not suffer to such a great extent as other industrials.

Celotex Corporation—Net income for nine months ended July 31, 1946, was $2,436,330 as against $489,499 for the comparable period a year ago.

Crown Zellerbach Corporation—Net income for the quarter ended July 31, 1946, was $2,704,605 as against $1,878,221 for the comparable quarter in the previous fiscal year.

Paraffine Companies—Net profit for the first half of 1946 was $1,014,547 despite a 135 day shutdown of the companies' main plants by labor difficulties.

Puget Sound Pulp & Timber Co.—Net profit for the first six months of 1946 was $348,838 as against $211,413 for the first half of 1945.

Rayonier, Inc.—Net profit for three months ended July 31, 1946, was $689,358 as against $470,103 for the same quarter a year ago.

United Wall Paper, Inc.—Net income for the year ended June 30, 1946, was $759,413 as against $533,857 for the previous fiscal year.

West Virginia Pulp & Paper Company—Net income for the nine months ended July 31, 1946, was $3,695,219 as against $1,763,215 for the corresponding period the previous year.

Stock Flotations and Financial Operations

Celotex Corporation has borrowed $1,300,000 from the Bank of America National Bank at 1⅞ per cent for the acquisition of a roofing plant and felt mill at Los Angeles, and has purchased 83.33 per cent of the stock of the El Rey Products Company.

Hudson Pulp and Paper Corporation is offering the public $3,000,000 in 3½ per cent stock to be applied for the construction of a new pulp mill at Palatka, Florida, at a total cost of $6,500,000.

International Paper Company has called for redemption all outstanding convertible 5 per cent preferred stock, which has been replaced by a 4 per cent issue and common stock given in exchange for that portion converted before the redemption notice.

Nekoosa-Edwards Paper Company—A new issue of 63,000 shares of the company's stock has been offered at $26.75 to increase wood inventories, improve recently acquired Canadian timberland, and for general corporate purposes. The offering totals $1,785,250.

St. Regis Paper Company is taking steps to increase its capital from $47,027,070 to $72,027,070 by an issue of new preferred stock. All of the outstanding cumulative 5 per cent preferred stock has been called and it is planned to issue 250,000 shares of a new $100 par first preferred stock at a lower cumulative interest rate than the securities being retired.

New York Stock Exchange—Stocks

	Closing Prices Sept. 25	Aug. 25
A.P.W. Products..	5⅜	7½
Celotex	28	30⅝
Same Preferred .	20⅞	*21¼–21¾
Certain-teed Prod..	17⅛	22⅜
Champion P&F Co.	47¼	58¼
Same Preferred.	*106–109	*111⅜–112
Container Corp. ..	40	44¾
Cont. Diamond ..	9⅞	13
Crown Zellerbach..	29⅛	33¾
Same Preferred .	105⅛	*109–109½
Same $4 Pref. .	*113–118	128½
Dixie Vortex	35	44½
Same "A"	51	53½
Robert Gair Co. .	8	9⅞
Same Preferred .	*19–19⅝	20⅝
Gaylord Container .	17	19½
Same Preferred .	*90–107	*108–117
International Paper.	42⅜	48⅜
Same $4 Pref. ..	108	*108–110
Kimberly-Clark ...	25½	30
McAndrews & Forbes	*33–35¾	40
Masonite	57	65½
Mead Corp.	21¼	25
Same Preferred .	*104–107	107½
Same 2d Pref. ..	45	..
National Container.	28½	33
Paraffine Cos.	63½	*72–76½
Same Preferred	*108–113	*111–115
Rayonier, Inc.	19⅜	24½
Same Preferred .	35	37⅞
Scott Paper	45¼	*57–59
Same Pref. .	*102–103	*106¾–107¾
Sutherland Paper ..	43½	47¾
United Paperboard.	9⅜	10⅝
U. S. Gypsum....	106	118⅞
Same Preferred .	*198–202	*203–205
United Wall Paper	8½	10½
Same Preferred .	*44–50	50

New York Stock Exchange—Bonds

Abitibi 5%	...	...
Celotex 3½%....	103¾	...
Certain-teed Prod 5½%	...	...
Champ. P&F Co...	104¼	...
Internat. Pap 5%..	102½	101⅜

New York Curb Exchange—Stocks

Am. Writing	8¼	10½
Great Northern ..	39½	45⅜
Hummel Ross	14	15¾
St. Regis	10	12⅜
Taggart	8⅜	...

*Closing Bid and Asked Prices.

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V★S is the simplest, most efficient and most economical means of providing "on the spot" adjustable-speeds for production and processing operations . . . *and it's all-electric.*

Besides an infinite range of *stepless* speed changes, V★S offers unbelievably smooth acceleration and deceleration—instantaneous starts and stops—and maintenance of proper tension for roll-fed materials. All V★S functions can be controlled manually or automatically, from near-by or remote stations.

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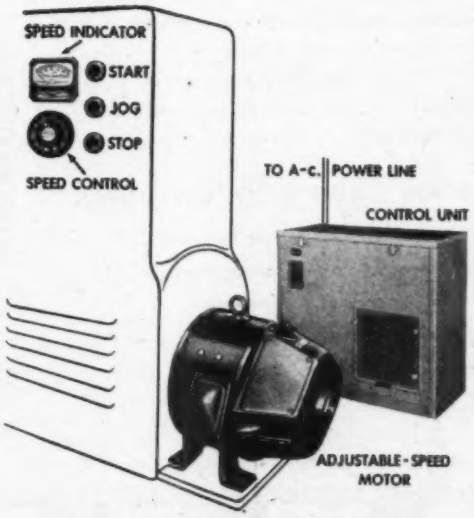

Conveniently-packaged, space-saving V★S Drives available in Rotating or Electronic Systems or a combination of both.

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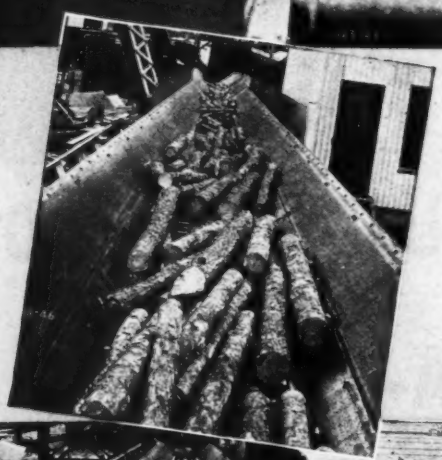
"Motor-Drive is More Than Power"

Double Strand PULPWOOD CONVEYOR

Using Jeffrey PW 132 Chain
(PATENTED)

with S-212 Spurs



Note the ruggedness of the spurs, formed from ¾" steel plate, unbreakable and cannot become detached from the chain. These features combined with the extra-wearing qualities of the Jeffrey PW type chain permit a trough construction of the simplest and most economical design. Send for complete information.

JEFFREY EQUIPMENT INCLUDES:

Belt Conveyors	Log Haul-ups
Chip Conveyors	Re-Chippers
Crushers (salt cake)	Shredders
Elevators (bucket)	Unloaders (barge)
Feeders (lime, salt cake)	Transmission Machinery

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RIFFLER SYSTEM AT NEPCO PORT EDWARDS MILL REBUILT

Another of the many projects undertaken by the Nekoosa-Edwards Paper Company in its postwar improvement and expansion campaign is the rebuilding of the riffler system in the Port Edwards (Wis.) sulphite mill. Completed late in September, the system is now in operation.

The improved riffler system consists of a battery of six shallow concrete aqueducts, each duct measuring about seven feet wide by seventy-five feet long. The bottom of each duct consists of a network of baffles designed to trap any dirt particles or foreign matter that may find its way past previous screening operations.

The improved riffler system is of reinforced concrete construction. It provides better performance at a lower maintenance cost than the older wood and steel design. By rebuilding the rifflers a section at a time it was possible to complete the job without a loss of production time.

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WASTE LIQUOR CONVERSION PLANT TO BE BUILT BY COOS BAY PULP COMPANY

A conversion program for the manufacture of by-products from waste sulphite liquor has been presented to the Washington State Pollution Control Commission by the Coos Bay Pulp Company, Anacortes, Washington.

Jack Taylor, director of the Commission, states the company will spend at least $435,000 on a site and building within the coming year. Contract for the work has been given to the Berger-Krueger Company, Seattle. Products manufactured from the waste liquor will include yeast, sulphur dioxide, fertilizer, acetones, ethyl and butyl alcohols and fuels.

◆

NEW NEKOOSA YARD OFFICE

A new yard office at the Nekoosa division of the Nekoosa-Edwards Paper Company to replace the oldest office building in the city is now under construction. Excavation for the 48 x 20 foot building commenced September 1st. The structure will be of a design harmonious with other new Nekoosa-Edwards building projects.

Foundations for the new office, located at the east end of the Nekoosa yards, have already been laid. Construction is to be of glazed tile decorated with concrete trim along window borders and entrance ways.

Windows will be of glass block and will be equipped with ventilator panels of plate glass. Concrete coping will be installed along the top edge of the building in such a manner as to blend with concrete trim of windows and doorways.

The front entrance, centered in the north side of the building, opens into a hallway which divides the structure into two sections of approximately the same size. The section north of the hallway will be devoted to office space and the south end will contain modern rest rooms, showers and a locker room.

The office will be heated by an oil-burning hot air system also located in the south end of the building. Time clocks and card racks for yard employees will be installed in the center hallway.

The office space, measuring about 18 feet square, will be occupied by yard supervisory and clerical personnel headed by F. R. Goddard, Sr., Nepco superintendent of yards.

◆

LONG-SERVICE SALARIED EMPLOYEES GIVEN THREE WEEKS VACATION BY K-C

A new vacation policy which becomes effective immediately, has been adopted by the executive committee of the Kimberly-Clark Corporation, Neenah, Wisconsin. Under the plan, all long-service salaried employees will be allowed one additional week (three weeks in all) of paid vacation. Approximately 500 employees will be eligible under this new policy.

In determining eligibility, the years of service on the hourly payroll are to be included if the salaried position held is not a temporary one. This change places Kimberly-Clark among the first companies in the industry to award this recognition to long-service employees.

◆

INVITATION CONFERENCE HELD AT FORESTRY COLLEGE

An invitation conference was conducted October 2 at the New York State College of Forestry at Syracuse, New York, for the purpose of emphasizing the dwindling supply of pulpwood for making paper products and growing dependence of United States industry on its own materials in this field. The conference was arranged by the Northeastern Wood Utilization Council, in co-operation with the college. Of 80 listed present, 20 represented paper-mill interests.

The subject was "New Developments in Hardwood Pulp," and V. L. Haroer, director of the Northeastern Forest Experiment Station at Philadelphia, spoke first, making these points:

The United States must look to domestic sources for future pulpwood supply; softwood timber supplies are tight; there is a surplus of growth over utilization of hardwoods, especially of lower grades and species little used; the indicated policy is to grow more timber through better forest management and to utilize the surplus hardwoods. He estimated $3,000,000 cords of such hardwoods in New York and New England stands at present.

"Hardwoods have been cut over considerably but an abundance of undesired timber remains. It ought to be used and would take some of the tightness out of the situation," Mr. Harper said.

The demand for housing wood and for pulpwood to some degree drains the same resources in softwood, the governmental director said.

◆

NEW WISCONSIN COMPANY INCORPORATED UNDER NAME SULPHITE PRODUCTS CORP.

Articles of incorporation have been filed by a new Wisconsin organization to be known as Sulphite Products Corporation. Thirty thousand shares of stock have been listed at $30 per share and headquarters will be in Appleton, Wisconsin.

The new company has been organized to exploit new processes for the manufacture of useful by-products from sulphite paper mill waste under methods discovered by joint research efforts sponsored by Wisconsin paper manufacturers and the state department of sanitary engineering at the Institute of Paper Chemistry.

The articles of incorporation were signed by A. B Hansen, Northern Paper Mills, Green Bay; John G. Strange, of the Institute of Paper Chemistry; and H. A. Rothchild, of Kimberly-Clark Corporation, Neenah.

◆

NICOLET PAPER CORPORATION ACQUIRED BY MILPRINT, INC.

Acquisition of Nicolet Paper Corporation, at De Pere, Wisconsin, by Milprint, Inc., Milwaukee manufacturer of packaging materials and a variety of other printing specialties, was announced October 2.

All outstanding capital stock of Nicolet was acquired and Milprint will operate the De Pere plant as a wholly owned subsidiary. M. T. Heller, president of Milprint, said that $2,500,000 was involved in the transaction. Mr. Heller said the new subsidiary would assure Milprint of a source of supply. Established as a writing paper mill, the Nicolet plant shifted to glassine paper 15 years ago and Milprint since has taken most of its consumption.

Mr. Heller will succeed C. B. Clark as president and a director of Nicolet. Other management changes will include: William Heller, Milprint vice president, to succeed H. B. Kuhns, of Chicago, as vice president and a director of Nicolet; R. N. Ewens, Milprint treasurer, to succeed Carlton R. Smith, Neenah, as treasurer and a director; Arthur Snapper, Milprint secretary, to succeed Mowry Smith, Neenah, as a director. E. J. Dempsey, of Oshkosh, a director of Milprint, will continue as secretary and a director of Nicolet.

No changes in other executive posts at Nicolet or in other personnel are contemplated, it was said. The Nicolet plant has about 300 employes and maintains a sales office in Chicago.

Besides the new De Pere branch, Milprint has taken plants in Milwaukee and branches in Philadelphia, Los Angeles, San Francisco, Portland, Oregon, and Tucson, Arizona.

◆

NAT'L STREAM IMPROVEMENT COUNCIL MEETS IN BOSTON

Expenditures of $270,000 by the paper industry to aid in ridding waters of pollution caused by pulp operations was reported to New England members of the National Council for Stream Improvement at a meeting October 2 in Boston.

The paper industry is "determined to find a solution to the problem," said Clyde Morgan, president of the Eastern Corporation, Bangor, Maine.

Russell L. Winget, executive secretary of the Council, said New England has two "hot" problems of paper waste pollution in the Androscoggin and Housatonic rivers. Considerable research, he said, is being applied to find methods for controlling odors which are a "recurring annoyance to Lewiston, Maine."

Dr. W. A. Lawrence, Bates College consultant to the Council, reported that the Androscoggin River, with a 1,200-foot drop in 170 miles, flowing through the heart of Lewiston, offers a peculiar problem. Turbulence of the river results in unusual release of odorous gases, including marsh gas, or methane, he said.

Dr. W. H. Sawyer of Bates, another consultant, declared the river apparently had considerable powers of recovery because fish life appeared to be growing in the autumn of the year after almost non-existence in the summer.

J. Elliott Hale, executive secretary of the Maine Sanitary Board, observed that even if the mills shut down along the river, the stream would not clear up for 10 years because of deposits of sewage solids.

▶▶▶ THE OLD PAPER MILL belonging to John C. Hornbeck's Sons, Napanoch, New York, has been bought by Ben Gartner of New York City, head of a paper stock concern. The newly purchased mill will be renamed the Napanoch Paper Mills, and before production begins, extensive alterations will be made. When in operation the mill will produce nine point specialties, cylinder wrapping, and other papers.

◆

▶▶▶ A BRIDGE ACROSS THE Escambia River in Florida has now been approved by the county comission of Escambia County. The construction of the bridge by the St. Regis Paper Company will cut forty-five miles from the distance now traveled between Alabama and Florida and will greatly facilitate the work on the new papermaking plant under construction by St. Regis at Altmore, Alabama.

◆

▶▶▶ THIRTY-EIGHT graduates of the New York State College of Forestry took the forest option of the U. S. Civil Service examination given in June. Thirty-three were successful. Only 83 per cent of the 537 men from all of the United States taking the test passed it.

◆

▶▶▶ PURCHASE OF A minority interest in the Peavey Paper Mills, Incorporated, Ladysmith, Wisconsin, has been announced by the *Milwaukee Journal*. As soon as changes in manufacturing equipment can be made, the Peavey Mill will produce newsprint for the Journal. The mill will continue to manufacture toilet tissue.

◆

▶▶▶ APPROVAL HAS BEEN GRANTED by the Civilian Production Administration for a $100,000 factory addition to the Fort Edward Paper Company, Green Bay, Wisconsin, and a $24,000 addition to the Consolidated Water Power and Paper Company, Wisconsin Rapids.

◆

▶▶▶ FOR THE BEST ANNUAL financial report, the bronze "Oscar of Industry" has been awarded by *Financial World* to the Masonite Corporation of Chicago. The award made at a banquet in the Grand Ballroom of the Waldorf-Astoria in New York, October 4, signifies first place in the building supplies industry. The Masonite report was judged best in its field by a committee which included Dr. Lewis Haney, Economics Professor, New York University, C. Norman Stabler, financial editor, *New York Herald-Tribune*, Glenn Griswold, editor and publisher of Public Relations News, Sylvia F. Porter, financial editor, New York Post, and Lester Tichy, industrial artist.

◆

▶▶▶ CERTIFICATE HOLDERS of the Brown Company preferred and common stock met September 16, at Portland, Maine. The meeting voted to continue until October 1, 1951, the voting trust agreement which allows the election of company directors by three voting trustees. Seventy-six per cent of the holders of preferred stock and seventy-one per cent of the holders of comon stock backed the continuance of the directors election procedure.

◆

▶▶▶ GROUND HAS BEEN BROKEN for a new plant of the Kieckhefer Container Company, Milwaukee, Wisconsin, to be located at Bensenville, Illinois, after approval by the CPA was given to the project. The factory will produce paper for fiber milk containers for local use and for distribution to the central states area.

◆

▶▶▶ INCORPORATION OF THE Gulf Paper Company, Incorporated, Pensacola, Florida, under an issue of 25,000 shares at one dollar par value has been accomplished. The incorporators of the firm are: Ashley D. Pace, Jr., A. D. Pace, and John D. Snyders.

◆

▶▶▶ ESTABLISHMENT of The Work Measurement Institute in Chicago has been announced by George Fry & Associates, Chicago and New York. This Institute will make available to industry the facilities of the company's work measurement laboratory which has been used for some time in training industrial engineers in modern techniques of work measurement and wage incentive programs.

◆

▶▶▶ THE STATE OF OHIO became the thirteenth state to join the nationwide tree-growing movement when certificate ceremonies were held on the 120-acre Izaak Walton Association Tree Farm in Cedar Valley near Wooster, Ohio, September 16. Dedication of two additional tree farms, one belonging to author Louis Bromfield, brings Ohio's total certified tree farm area to 348 acres, making the state the first hardwood tree state and the first of the Central States to inaugurate a tree farm project.

YOU may never see the Columbia Trade-mark on any finished product you buy, but more likely than not, Chlorine or Alkalies, or some of the other related products that Columbia produces, were used somewhere along the line of its manufacture. Columbia Chemicals are essential to many things—as ingredients—as aids to bringing about chemical reactions—or in the treatment of materials to change or improve their characteristics. So widespread has become the use of Columbia Chemicals, that today there is scarcely an industry that does not depend on them to make products better—more lasting—more useful.

COLUMBIA ESSENTIAL INDUSTRIAL CHEMICALS

Soda Ash • Caustic Soda • Liquid Chlorine • Sodium Bicarbonate • Pittchlor (Calcium Hypochlorite) • Silene EF (Hydrated Calcium Silicate) • Calcium Chloride • Soda Briquettes • Caustic Ash • Phosflake • Calcene T (Precipitated Calcium Carbonate) • Modified Sodas.

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COLUMBIA CHEMICAL DIVISION
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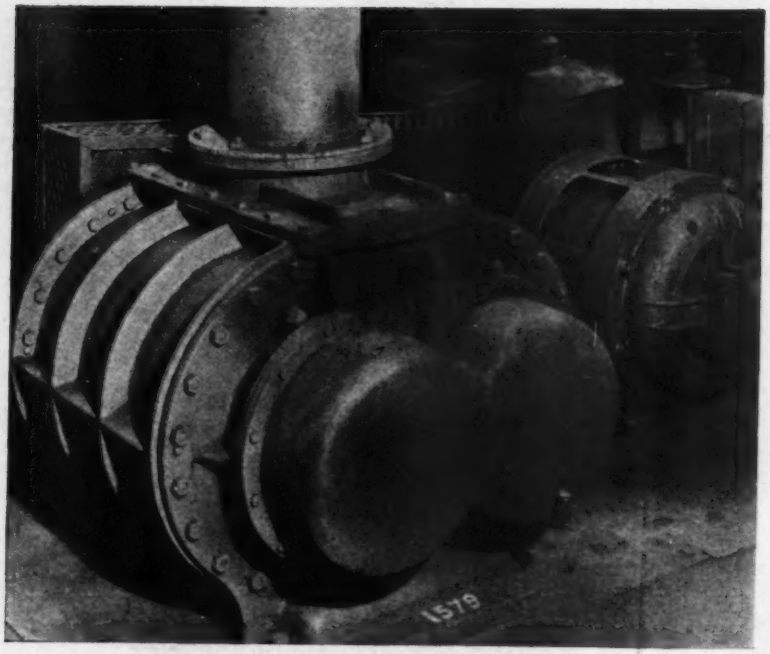


TODAY IS NO TIME FOR

SHUTDOWNS!

This truism applies equally to all lines of activity today—manufacturing or mining—paper mills or chemical plants—blast furnaces or coke ovens—no matter what.

That's why the performance of this Roots-Connersville Rotary Positive Blower is proving so satisfactory to its coal mine owners. In spite of severe operating conditions in the coal-cleaning house, the blower goes right on separating coal from slate and bone. It's a rough, tough job, but the R-C unit takes it in stride.

This particular job indicated the Rotary Positive type, so that's what we recommended. However, where requirements favor Centrifugal equipment, we're equally at home there because of our *"dual-ability"* to design and build either type. Without prejudice, we judge each application on its merits, and then furnish the best blower *for you*, based on our 90 years of experience.

Give R-C *"dual-ability"* a chance to solve your problem, no matter how difficult or unusual it may be.

ROTARY POSITIVE

CENTRIFUGAL

ROOTS-CONNERSVILLE BLOWER CORPORATION

One of the Dresser Industries

610 Monroe Avenue, Connersville, Indiana

Roots CONNERSVILLE SINCE 1854

BLOWERS FOR EVERY NEED

ROTARY POSITIVE AND CENTRIFUGAL BLOWERS • EXHAUSTERS • BOOSTERS
LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

▶▶▶ PURCHASE OF MORE THAN 5,000 bushels of red pine cones in northern Lake States area will be made by the U. S. Forestry Service this year. Forest officers in the Chequamegon and Nicolet national forests in Wisconsin, Chippewa and Superior in Minnesota, as well as in forests in upper and lower Michigan will buy the cones. Some of the seed from the cones will be used in the 1947 sowing which tentatively calls for the planting of 39,560,000 trees in national forests of the northern lake region; the rest of it will form a reserve for future use.

◆

▶▶▶ A NEW BRANCH has been opened in Los Angeles by the Container Testing Laboratories, Incorporated, to extend its services to southern California. The new offices will be located at 9047 Wilshire Boulevard, Beverly Hills, California, and will be under the direction of Lee M. Smith, who in the past has been associated with the Fort Wayne Corrugated Paper Company. Until recently he was sales manager of the Chicago division of that company.

◆

▶▶▶ AERIAL PHOTOGRAPHIC survey will be made of all forest crop lands in Marinette County, Wisconsin, replacing more costly ground surveys. The aerial survey of the 218,000 acres will be used to determine the exact acreage of timber, the extent of its growth, and as a basis for the sale of stumpage. The Marinette forestry program includes the planting of 400,000 young jack and Norway pine trees. Stumpage sales in the county have brought in $41,000 in the past eighteen months. An automatic tree planter, one of the first to be used by Wisconsin counties, has been placed in use this year.

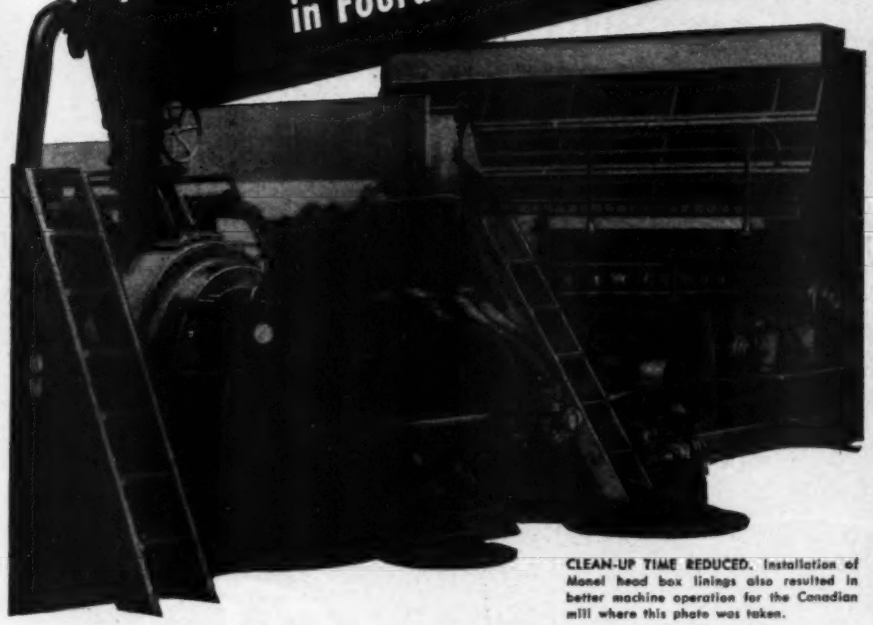
◆

▶▶▶ DAMAGE DUE TO FIRE in the California woodlot acreage this year through the month of August was slightly less than the damage suffered during the same period last year, according to a report of the officials of the Department of Agriculture, forestry division. Last year, 500,000 acres of forest area were destroyed, and a reported 20 per cent of the 9,000 fires were started by roadside carelessness. Tourists visiting California this year have been warned of the hazards of forest fires by pamphlets distributed by the state agriculture department in conjunction with the California State Chamber of Commerce.

◆

▶▶▶ CPA APPROVAL has been granted the Institute of Paper Chemistry (Appleton, Wis.) for the construction of a boiler house to be built at an estimated cost of $15,541.

PREVENT SLIME and STOCK ACCUMULATION in Fourdrinier Wet Ends



CLEAN-UP TIME REDUCED. Installation of Monel head box linings also resulted in better machine operation for the Canadian mill where this photo was taken.

RELINING THE CYPRESS WOOD head box. Monel sheets were overlapped one inch at the edges, then fastened to the wood with *Anchorfast* Monel nails.

LOOKING IN on the finished job. These shiny, corrosion-resistant Monel surfaces will stay smooth . . . free from slime and stock accumulations.

CLEANING the head boxes on these machines was once a laborious job.

But not any more. The boxes have been relined . . . *and this time with Monel**.

Read what the Paper Machine Superintendent of this prominent Canadian mill now reports:

"Very little effort is needed on clean-up days to keep the Monel linings slick and clean . . . all that seems necessary is to wash the walls down with a fresh water hose."

That's just about all there is to it. And here's why.

Monel resists corrosion and pitting by paper stocks and white waters. The surfaces stay smooth, never give slime and fibre accumulations a chance to dig in and hang on. Clean-up days are always easy days, for acid cleaning and hand-scraping aren't necessary.

First used in this mill in 1944, Monel head box linings performed so satisfactorily that additional Monel linings were installed last year. As strong and tough as these shiny, corrosion-resistant linings are, installation was a simple job. Monel is readily bent, formed and shaped. It is easily cut and machined, and can be welded, soldered or brazed by commonly used methods.

A metal with Monel's characteristics has many uses in wet machines and in other types of pulp and paper mill equipment.

PRINCIPAL USES OF MONEL ON FOURDRINIER WET ENDS†

- Apron Plates
- Bolts & Other Fastenings
- Brace Rods
- Cross Braces
- Breast Rolls
- Dandy Rolls
- Distributor Rolls
- Doctor Blades & Backs
- Flow Boxes
- Flow Box Midfeathers
- Rolls
- Rectifier Plates
- Remover Beams
- Remover Cross Drive Shaft
- Save-All Trays & Pans
- Shower Pipes & Nozzles
- Side Beams
- Slice Blades
- Suction Box Covers
- Suction Boxes
- Table Rolls
- Wire Return Rolls

†Under exposure to corrosive conditions generally encountered in Fourdrinier wet ends, Monel is safely used in combination with brass and copper parts.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall St., New York 5, N. Y.

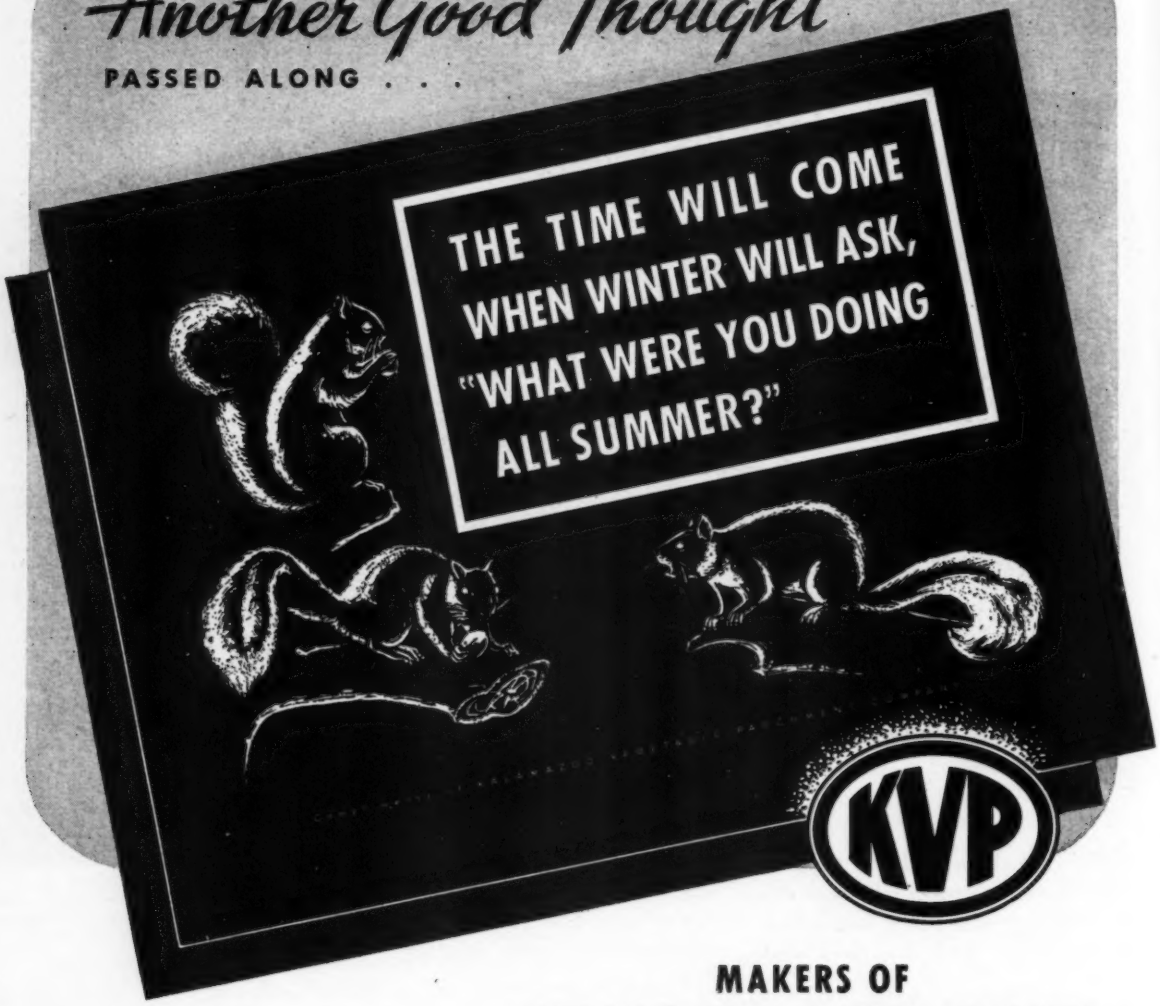
MONEL NICKEL INCO TRADE MARK ALLOYS

MONEL*· "K" MONEL*· "S" MONEL*· "R" MONEL*· "KR" MONEL*· INCONEL*· NICKEL · "L" NICKEL*· "Z" NICKEL*

*Reg. U.S. Pat. Off.

Another Good Thought

PASSED ALONG . . .



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AND WRAPPING PAPERS

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WAXED . .

KALAMAZOO VEGETABLE
PARCHMENT COMPANY

. . .

PARCHMENT · KALAMAZOO 99 · MICH.

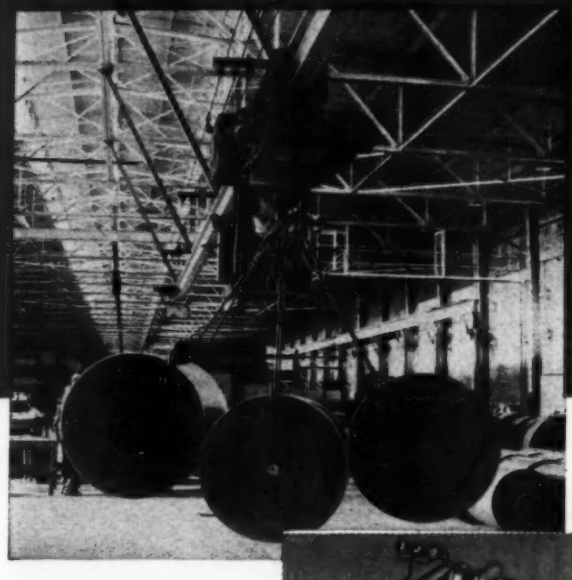
BRANCH PLANTS IN HOUSTON, TEXAS
AND PHILADELPHIA, PENNSYLVANIA

"THE WORLD'S MODEL PAPER MILL"

LIFTING HEIGHT *Increased* 2 FEET

WITH THIS

NORTHERN HI-LIFT ELECTRIC HOIST



This Northern Hi-Lift Electric Hoist provides two feet more lift for handling paper in a large southern mill.

Northern Hi-Lift Hoists provide 12″ to 36″ extra lift, according to the capacity hoist—providing that much extra height in your present buildings—or saving that much in new buildings.

Northern Hi-Lift Hoists are number one favorites in hundreds of mills due to their dependability and exceptionally heavy construction.

SEE THIS POWERFUL MECHANICAL LOAD BRAKE

The powerful automatic disc and helix type mechanical load brake in the Northern Hi-Lift Hoist controls the lowering load, and can stop it independently of the electric brake. All wearing parts accessible—particularly brake surface.

ROLLER BEARINGS—HARDENED STEEL GEARS

Machine cut hardened steel gears, ample size roller bearings, turned and ground shafts, press fits—one piece welded frame.

Gears operate in oil bath, and distribute lubricant to bearings.

TYPES OF NORTHERN HI-LIFT HOISTS AVAILABLE

Floor controlled hoists • Motor traveled hoists
Cab controlled hoists • Base mounted hoists

See our catalogs in Sweet's Files of Process, Mechanical and Engineering Industries.

New information on electric hoists, dimensions, engineering data, etc., is ready in this complete bulletin. Write today for Bulletin H-110.

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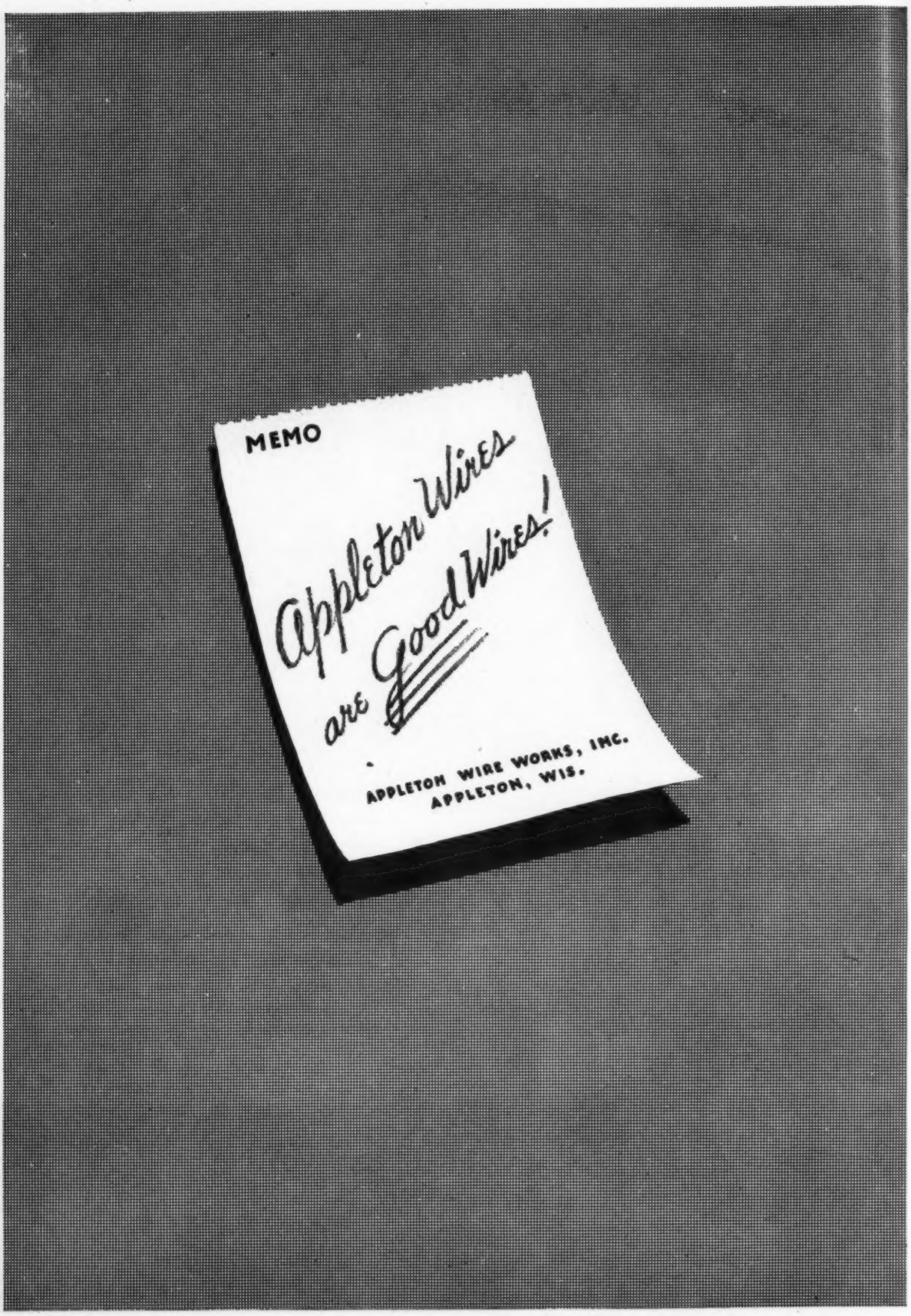
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Appleton Wires are Good Wires!
APPLETON WIRE WORKS, INC.
APPLETON, WIS.

A promising future in valve economy

ALWAYS USE THE RIGHT TYPE VALVE FOR THE SERVICE
BE SURE TO PLACE VALVES CORRECTLY IN THE LINE
CHOOSE JENKINS VALVES FOR LIFETIME ECONOMY

If you follow this Jenkins 3-Point Formula, you can look forward to years of low cost valve operation.

Valves chosen wisely to withstand specific service conditions will require a minimum amount of maintenance.

Valves installed correctly are sure to last longer, remain trouble-free.

Valves made by Jenkins will give you *extra endurance* that means *extra years* of service life.

So, with a clairvoyant eye on future costs, base your valve buying on the 3-Point Formula. Jenkins engineers, top-flight valve specialists, will gladly help you on any question of selection or placement. For the *lowest cost in the long run*, specify Jenkins.

Jenkins Bros., 80 White Street, New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco; Jenkins Bros., Ltd., Montreal, Canada; London, England.

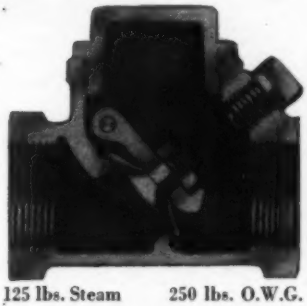
LOOK FOR THIS DIAMOND MARK

SINCE 1864

JENKINS VALVES

For every Industrial, Engineering, Marine, Plumbing-Heating Service . . . In Bronze, Iron, Cast Steel and Corrosion-resisting Alloys . . . 125 to 600 lbs. pressure

Sold Through Reliable Industrial Distributors Everywhere



125 lbs. Steam 250 lbs. O.W.G.

JENKINS Fig. 92
Regrinding
BRONZE SWING CHECK VALVE

Designed for service on non-return control systems; especially in connection with the use of gate valves where a comparable, full free flow of steam, oil, water or gas is required. Also widely used for condensate and return lines. Even at extremely low pressure, seat remains tight. The bronze disc, carefully machined to a smooth, snug-fitting finish, can be reground easily without removing valve from the line.

ONE OF OVER 600 *EXTRA VALUE* VALVES MADE BY JENKINS *VALVE SPECIALISTS*

The Land of Trees and Water

Paper out of wood! The very idea gave the green light to America, a veritable land of trees and water. Paper mills mushroomed up along the rivers. First through New England, New York, Pennsylvania, then across the continent even to the far Northwest, moved men, money and machines to make the new paper

Through the forests rang the sound of the woodsman's axe. Down swift streams logs went pouring to the pulping mills. The nation, bristling to build, to expand, create, to tell the world the sweet story of liberty, was stirred by the thought of cheap and plentiful paper. Now the printing press need never cease its roar. Plentiful paper had touched off a staggering cycle of industrial and educational expansion for America.

Paper—paper out of wood—had become the product most used by man.

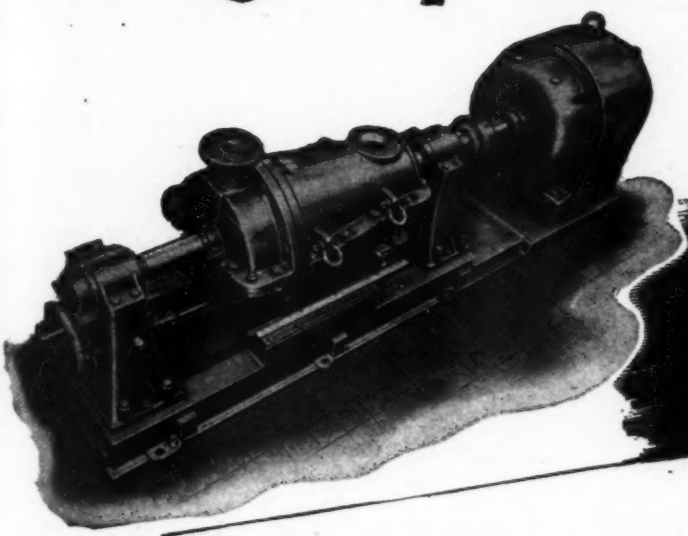
The dramatic story of paper is told in the sound-and-color film, "Paper—Pacemaker of Progress," and in a book under the same title. Both are presented by F. C. Huyck & Sons as a tribute to the Paper Industry. The book will be sent free upon request.

F. C. HUYCK & SONS • *Kenwood Mills* • ALBANY, NEW YORK

KENWOOD WOOL PRODUCTS

HUYCK *Felts*

a mighty mite for stock preparation



THE JONES *High Speed* REFINER

APPLICATION No. 4:—
In a mill making kraft condenser, the JONES HIGH SPEED REFINER completely eliminates many long hours of beating. By using a cycling arrangement, it produces a better sheet more efficiently.

APPLICATION No. 5:—
In a board mill, the JONES HIGH SPEED REFINER defibres over issue news (replacing a 150 H.P. Refiner). The stock comes slushed from breaker, passing directly into the Jones Refiner which runs at 1200 R.P.M., using 60 H.P., and producing 22 tons per day.

APPLICATION No. 6:—
In another mill, the JONES HIGH SPEED REFINER is used exclusively for clearing flakes from coated book broke (replacing a larger Jordan, 150 H.P. motor) — and operates at 900 R.P.M., using 40 H.P. Volume of stock handled is 2400 lbs. per hour, and more.

Jones

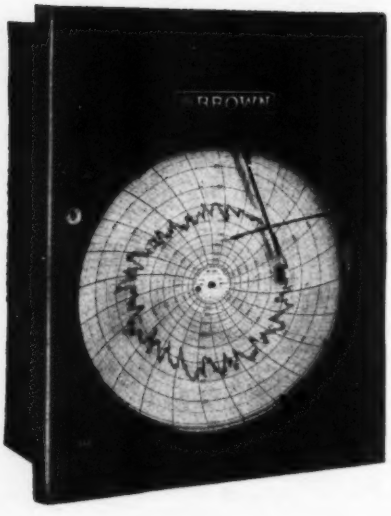
E.D. JONES & SONS COMPANY-PITTSFIELD, MASS.
Builders of Quality Machinery for Paper Mills

MANUFACTURERS AND DISTRIBUTORS IN CANADA: WATEROUS LTD., BRANTFORD, ONT.

grasp these savings

in FUEL DOLLARS !

By elimination of needless waste in steam distribution, fuel dollars can be saved. Grasp these savings through the use of Brown Totalizing Flow Meters.



Brown Electric Recording Integrating Flow Meter

Brown Flow Meters' permanent two-fold records make possible dual savings. The *record line* shows rate of flow . . . enabling you to analyze steam usage . . . while the *automatic planimeter* pen shows consumption . . . simplifying cost accounting.

Permanent records are the needed incentive to eliminate wasteful steam usage. Brown Totalizing Flow Meters are effecting substantial fuel savings for thousands of steam engineers and have saved installation costs many times over.

Available in seven interchangeable range tubes, their capacity can be quickly altered to suit production conditions. It is seldom necessary to change the orifice. Models furnished for pressures up to 2500 lbs.

Write for catalog. THE BROWN INSTRUMENT COMPANY, a division of Minneapolis-Honeywell Regulator Company, 4489 Wayne Avenue, Philadelphia 44, Pa. Offices in all principal cities.

Toronto, Canada **London, England**
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BROWN FLOW METERS
. . . MINNEAPOLIS - HONEYWELL CONTROL SYSTEMS . . .

SAFE FROM FARM TO MARKET...

PAREZ** RESIN 607

The chances of fruits, vegetables, and other perishable foods arriving at their destination crisp, cold, and fresh, have been greatly enhanced by shipment in crates lined with wet-strength paper made with PAREZ Resin 607. For PAREZ Resin 607 imparts such high wet-strength to paper crate liners that they remain strong even though packed in ice and exposed to continuous moisture. Crates have been damaged and broken—yet in many cases the wet-strength paper has held the contents intact. Thus PAREZ-treated paper provides extra protection for produce and reduces waste from spoilage.

Crate liners are only one of the many paper products being given new value and importance because of properties imparted by PAREZ Resin 607. Frozen food locker papers are strong and tear-resistant. Grocery and shopping bags, vegetable and meat wraps, labels for canned goods, barrel liners, and other grocery and food store papers are longer-lasting and more satisfactory when given the advantages of wet and dry strength secured with PAREZ Resin 607.

This same resin also improves fold endurance, printing qualities, and wet-rub resistance of almost any type of paper. Wet-strength paper can be produced by adding PAREZ Resin 607 in the regular paper manufacturing process very simply under Cyanamid's own process.

We shall be glad to supply paper manufacturers with complete data on the use of PAREZ Resin 607 for the production of wet-strength paper crate liners or any of the many other stronger, more serviceable paper products that are in increasing demand today.

AMERICAN Cyanamid COMPANY

Industrial Chemicals Division

30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

DISTRICT OFFICES: Boston, Mass.; Philadelphia, Pa.; Baltimore, Md.; Charlotte, N. C.; Cleveland, Ohio; Chicago, Ill.; Kalamazoo, Mich.; Detroit, Mich.; St. Louis, Mo.; Azusa, Calif.; Seattle, Wash. In Canada: Dillons Chemical Company, Ltd., Montreal and Toronto.

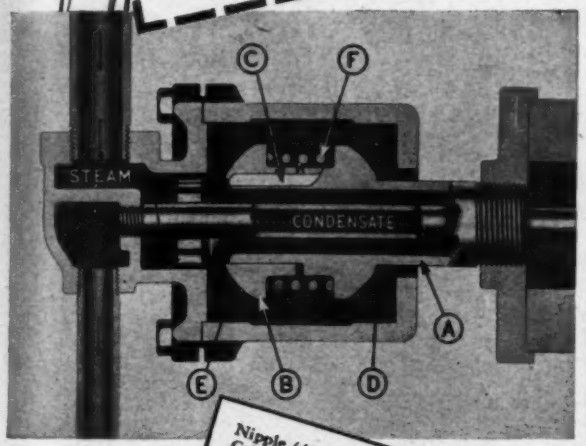
**Trade-mark of American Cyanamid Company covering its synthetic resins for use by the paper industry. The processes under which PAREZ Resin is applied in the production of wet-strength paper are covered by U. S. Patent Nos. 2,291,079; 2,291,080; and 2,345,543; and U. S. Patent Application Serial No. 453,032.

APPLETON FELTS

MAKE GOOD PAPER

APPLETON WOOLEN MILLS
APPLETON · WISCONSIN

. . . it's the biggest little trouble-saver in the mill . . .



Nipple (A) is connected to roll or drum. Collar (B) is keyed to it (C), but fits loosely so pressure can fill entire housing to act as sealing force. Both seat ring (D) and bearing ring (E) are of carbon-graphite, eliminate packing and oiling. Spring (F) is for initial seating only. Type B Joint shown; other types, sizes for all needs.

In terms of physical size alone, the Johnson Joint could hardly be called big machinery. But in its ability to save time and trouble, and promote plant efficiency, its stature approaches anything the industry has ever seen.

The Johnson Joint was designed to go after the old stuffing box and steam fit troubles in a business-like way, and it literally knocks the stuffing out of them. There's no packing of any kind. There's no oiling required, ever. There's no adjusting — the higher the pressure, the tighter the seal. There's little to fear from misalignment — with provision for both lateral and angular movement built right in. Note besides how neatly it provides for more efficient syphon drainage, through the same head that admits the steam.

In dollars and cents, what does all this add up to? Well . . . enough at least to pay the cost of switching over to Johnson Joints in just a short while. Enough certainly to make the Johnson Joint too big to overlook.

THE JOHNSON CORPORATION
845 WOOD STREET, THREE RIVERS, MICHIGAN

JOHNSON *Rotary Pressure* **JOINTS**

Write for literature and the name of your nearby Johnson representative.

BRONZE BOLTS
STAND THE STRAIN
Suspend 3 Miles of Drill Pipe

In modern oil wells the draw works are often required to lower and hoist more than 15,000 feet of drill pipe. Think of it! 3 miles of pipe weighing 30 pounds per foot!

Brakes on the draw works are constantly in use sustaining the entire load. For this rugged service Raybestos-Manhattan, Inc., have perfected a brake block and fastening device which depends upon Harper Bronze Bolts to withstand the shearing force of this tremendous weight.

Harper Everlasting fastenings made from high strength non-ferrous and stainless steel alloys are consistently specified by engineers to fight damp, rust-producing atmospheres and corrosive chemicals that would soon weaken common steel.

When you have a fastening problem in your industry, Harper engineers can help you.

THE H. M. HARPER CO.
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Bronze bolts hold Raybestos-Manhattan blocks securely. May be loosened easily for installation of new blocks.

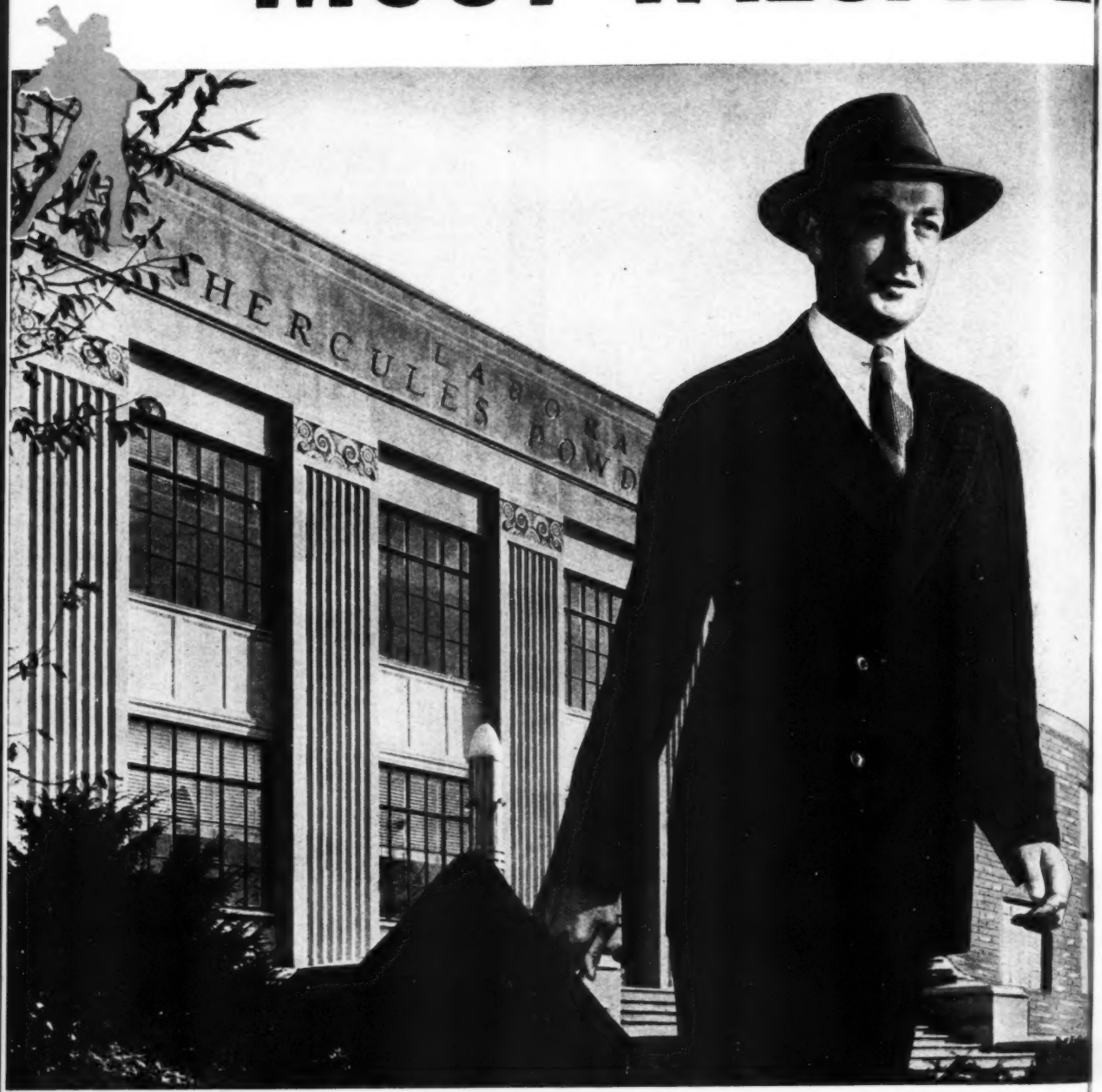
Draw Works on a modern oil well.

HARPER *Everlasting Fastenings* *Chicago*

MORE THAN 4850 TYPES OF EVERLASTING FASTENINGS IN BRASS, NAVAL BRONZE, SILICON BRONZE, MONEL, STAINLESS

Hercules offers you its

MOST VALUABL



Background: Hercules Experiment Station, Wilmington, Del. *Foreground:* Fred Donovan, Technical Sales Representative, Naval Stores Depart

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HERCULES

ASSETS...

1. Research
2. Service

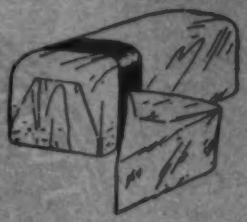
AT HERCULES' 37-acre Experiment Station, alone, more than 600 workers are employed constantly in improving existing Hercules products, and in developing new products and applications.

Linking these valuable research facilities to you are the numerous Hercules highly-trained field representatives. They are ready at all times to serve you in the application of Hercules products, no matter how moderate your needs.

For a description of the many Hercules chemical materials for industry, mail the coupon for your copy of the new 40-page book, "Hercules Products."

CHEMICAL MATERIALS FOR THE PAPER INDUSTRY

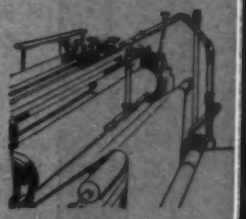
Hercules chemical materials for the paper industry include:



Staybelite* Esters...
Wax additives for coating and laminating processes, modifiers for GRS and Neoprene latices for impregnating and laminating paper and board stocks.

Hercolyn*...
A liquid resin for transparen ixing. Possessing excelle fiber-wetting properties, i useful for the production transparent and translu papers.

Chemical Cotton...
Hercules chemical cotton is a pure cellulose, in loose or sheet form. Cleanliness and brightness are outstanding.



Casein...
Hercules casein is used as binder in clay-coatings, as an adhesive in lamina and paper converting.

Paracols*...
Water-dispersible wax emulsions used to increase finish, flexibility, printability, and waterproofing of paper.

Chemicals...
These include sulphona oils, foam killers, even acids, alkalies, alum, satin white.

*Reg. U. S. Pat. Off. by Hercules Powder Comp

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Converts

CORN STARCH

INTO THE MOST
ECONOMICAL TUB SIZING,
CALENDER SIZING AND
LAMINATING ADHESIVES

R. T. VANDERBILT CO., INC.
230 Park Avenue, New York City

Decontrol

▶▶▶ PAPER IS SO TIED to the economic life and development of the United States that the mere hint that the production of fibers in this country is in short supply ought to send shivers of fear down the spines of consumers.

However, the consumers of paper products in this country are ignorant of the situation. Even the rank and file of the operators in the paper industry don't know the facts. If they did, they would be doing something about it. How many of them know that in the first six months of this year, 51 per cent of the fibers, which made up the total production for that period, came from outside this country? Canada supplied 31 per cent; Sweden, 17 per cent; and Finland, 3 per cent. The United States supplied 49 per cent.

The $64 question is, "Can the supply be maintained?" We doubt it, especially so long as OPA controls exist.

Let's look at the record:

In 1941, we had a wood pulp capacity of 11,275,000 tons and produced 10,375,422 tons, which is equal to 92 per cent of capacity—an all-time production high.

In 1945, the wood pulp capacity was 12,005,413 tons and we produced 10,164,868 tons, which is equal to 85 per cent of capacity.

In those five years the wood pulp capacity increased 730,413 tons, or 7 per cent. The production dropped from 10,375,422 tons to 10,164,868 tons, a loss of 210,554 tons, or 2 per cent loss.

Obviously, we had the capacity or facilities to produce more, but lacked the raw material fiber.

And this fact is all the more astonishing for we enjoyed the most overwhelming demand in all history during those five years.

Therefore, it is not lack of capacity, but the supply of raw material fibers which is limiting our production.

Immediately following V-E Day, a year and five months ago, the paper industry was set to proceed with the reconstruction plans to produce more paper products. We needed more fibers; we had plenty facilities. The war had taken terrific tolls from our forest, not only to maintain the highest production of paper, but also for lumber, poles, ties, and the multitude of end uses for which wood was demanded for war purposes.

Sweden emerged from the war with more than a million tons of fine wood pulp which she not only wished to sell us in order to obtain credits in American exchange, but also to reopen our market from which she had been shut out for five long years. They came here and bargained with us. The mills wanted to buy all of it. The Swedes needed a measley fifty cents a hundred pounds concession from the OPA to consummate the deal. Did OPA grant the concession? It did not, and, thereby, it deprived American mills, the American consumers and the country as well of a vital material benefit.

One million tons of pulp is in round numbers about 2,000,000 cords of pulpwood, which, had we taken all of it, would have relieved the drain on our depleted forests and the strain on our producing machinery.

It would have been, from a national standpoint, the smartest trade in the books to conserve our forests and take in all the forest products which Sweden or any other country could ship us.

OPA restrictions and controls plus the OPA "absorption of cost" policy are primarily to blame for the paper famine that is right now tightening its paralyzing grip on our efforts to obtain the fibers necessary to supply our famished American market.

Remove the OPA controls and the paper industry will solve its own problems as well as dispel the paper famine.

Freed from these withering controls, our industry will comb the world for our fiber supply. *It can be had.*

We can furnish American capital to build pulp mills in neighboring countries. We can buy pulpwood—worlds of it—in European countries.

But just so long as this postwar burocratic regimentation of this vital industry exists, no adequate plans for relief of our shortage of fiber will be forthcoming.

Who will invest money to increase the volume of paper products only to have them under the OPA "absorption of cost control"? It doesn't make sense. OPA will not voluntarily decontrol this industry. To do so, would take 35,000 bureaucratic politicians off the Washington payroll.

The only way we see to relieve the growing paper famine is to first decontrol OPA by ballot box compulsion and then the decontrol of the industry will automatically follow.

The production of paper products will then multiply.

The Minute Man as the wartime symbol of Defense, stood before his plowshare and raised his gun in defense of his country. . . . The cause he defended has been won, but the Minute Man remains the trade-mark of United States Savings Bonds. . . . During the nation-wide promotion campaign beginning November 11 and ending December 7, he will be seen as the peacetime insignia, gun at rest and his hand on the plow. . . . He walks with industry but remains vigilant.

". . . they shall beat their swords into plowshares, and their spears into pruning hooks: nation shall not lift up sword against nation, neither shall they learn war any more."—Isaiah 2:4.

To Bomb—Or Not to Bomb

WILLIAM SIBLEY

▶▶▶ THERE IS ONE GUY in Russia who can speak his mind freely—without censorship. He is Uncle Joe Stalin. Since he both makes and defines Russia's national and international policies, whatever he says for public consumption becomes most significant. It is true, of course, that as a world power the U. S. S. R. is still an adolescent, and as such frequently acts like a know-it-all nineteen-year old kid; yet this adolescent power is maturing rapidly and should be taken seriously, however juvenile it may act at times.

Not long ago the Generalissimo made public a statement in which he promised peace and co-operation with all other powers. In his statement there appeared at least one paragraph which should be studied by everyone since it does much to dispel some illusions and foolish thinking about the atomic bomb. Read it:

"I do not believe the atomic bomb to be as serious a force as certain politicians are inclined to regard it. Atomic bombs are intended for intimidating weak nerves, but they cannot decide the outcome of war, since atomic bombs are by no means sufficient for that purpose. Certainly monopolistic possession of the secret of the atomic bomb does create a threat, but at least two remedies exist against it:

"(a) Monopolistic possession of the atomic bomb cannot last long;

"(b) Use of the atomic bomb will be prohibited."

Ever since a year ago last August we have been told by scientists and politicians, high and low, jittery radio commentators, and under-informed editorial writers that the atomic bomb not only could decide the outcome of any war, but blow all mankind from the face of the earth. Much the same sort of fearful statements were made upon the discovery of dynamite, gun cotton and TNT. All those developments were going to "blow us to kingdomcome," yet here they are, doing gigantically useful work in mining, quarrying, earth moving, and general construction. They can be and are used for destructive purposes during war, but their big job is peacetime, constructive effort. The same will follow with atomic energy.

As for Stalin—he means exactly what he says. He is dealing with realities, not vagaries of the future. Furthermore, he is a very well informed man. He is a military strategist par excellence, as proved by the performance of the Red Army under his personal command. He knows that he does not have the bomb and that we do. But he also knows that we will not use it unless some nation attacks us, and that certainly we would not use it if we pledged ourselves not to do so. Without doubt the United States (in the not too far distant future) will pledge that very thing, by treaty. So Uncle Joe has little to worry about on that score. Stalin realizes (and doubtless appreciates) that the atomic bomb has not been used to force agreements with Yugoslavia or Russia, even when some American officers were held as hostages and some American planes shot down. Unless America is attacked, such as we were at Pearl Harbor, we are not likely to go to war with any nation. Stalin knows that.

Of course, it may safely be assumed that Russia will some day know how to make atomic bombs. (America has no monopoly on brains, however much Russia deplores our "monopolistic" tendencies.) But even so, Russia would be bound by the same treaty *not* to use the weapon except in defense. Certainly the atomic bomb has done nothing to upset Stalin's idea of death. He knows that the three hundred thousand Americans and the millions of Chinese, Russians, Germans, and others who met death by artillery fire are just as dead as those who met destruction by the release of nuclear energy.

That the bomb will be outlawed as a weapon of offense is certain. That it may even be outlawed as a weapon of defense is very probable. During World War I the entire planet was shocked by Germany's use of poison gas. There are gas victims still fighting World War I in some of the military hospitals of England and the United States. The indignant world demanded that poison gas never again be used in warfare—and whether or not the Nazis and the Nips were mad men, morons, or savages—even *they* dared not brave the public-opinion consequences of poison gas and refrained from using that weapon during World War II.

Such restraint is almost unbelievable on the part of such beasts as the Japs and the Nazis. Yet such is the power of public opinion when once thoroughly aroused. Such restraint will be imposed with respect to the war use of the atomic bomb. Stalin is one of the few people who fully realizes this fact, and so has few fears regarding its promiscuous use.

The problems of the misuse of war weapons will be solved only by the development and adoption of popular government throughout the world. Only when peoples everywhere are free to debate and discuss (yes, and disagree) all issues of this kind can we make full progress toward self-restraint in the matter of physical force. Only when peoples of the world are free to travel, easily and cheaply, to places of their choosing, and thereby come to know the economic and social makeup of their neighbors (Russia, please take note), will we understand each other to the point of appreciating one another and developing needed tolerance for the other's viewpoint.

Thank the gracious Lord for the swift, and ever swifter, airplane; the universality of the automobile; the instantaneous transmission of sound and illustration through radio, radar and television. These things will make for greater travel, greater appreciation of so-called "foreign" peoples, greater tolerance for the ideas of others. These things of themselves will make the broadcasting of atomic bombs, disease tubes, poison gas vessels, and even more horrible things yet to come—completely outlawed. At that time we will then be able to develop the *constructive* possibilities of present day destructive elements.

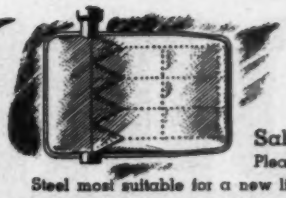
Stalin's words mean that Russia (since *he* is Russia) doesn't believe that the United States will start a war or use the atomic bomb. Drop that fact into your mind and let it explode a lot of foolish fallacies.

Are your Corrosion Problems

like any of these?

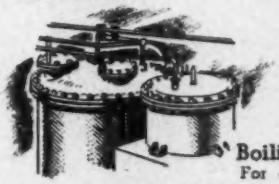
Everyone knows that Stainless is ideal for handling nitric acid—but what about corrosion from these other chemicals? Eastern's Technical Staff answer questions like these every day. Sometimes the answer can be found only with test sheets; more often the experience for which Eastern technical men have gained their esteem provides a rapid, accurate solution to the problem. And much basic, useful information on the corrosion resistance of all types of Stainless Steel is in the new complete catalog "Eastern Stainless Steel Sheets." Write for your copy. JMLco E-FP1

"Ask EASTERN for the Answer when STAINLESS is the Question"

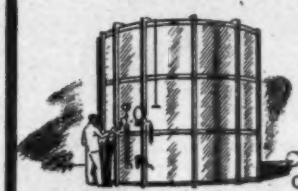


Salt Water?
Please suggest the type of Stainless Steel most suitable for a new line of highest-quality marine trim, including rudders and stabilizer fins.

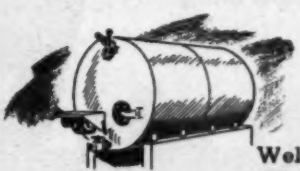
[illegible]t Juices?
Will E-S 18-8 Stainless (Type 302) canning reservoirs be all right for handling citrous fruit juices including lemon juice?



Boiling Peroxide?
For a new oxidation process using boiling concentrated hydrogen peroxide, would low-carbon E-S 18-8 stainless (Type 304) containers be resistant?



Chloride Storage?
Our processing involves storing cold alkali-metal chloride solutions (aqueous) in E-S 18-8 stainless tanks. How can we inhibit pitting at the liquid line?



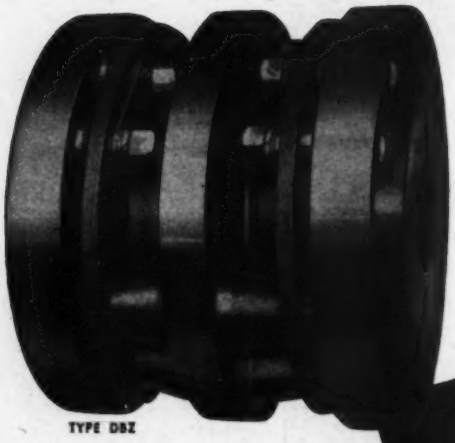
Welded Vessels?
What type of Stainless would you recommend for large all-welded autoclaves to handle reactions of maleic anhydride in making synthetic resins?

ES

EASTERN STAINLESS STEEL CORPORATION [illegible] E 3, [illegible] AN[illegible]

THOMAS *Flexible* COUPLINGS

. . . proven to be 100% dependable on wood choppers, centrifugal pumps and other heavy duty machinery in the paper manufacturing industry



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Today's modern high-speed paper manufacturing machinery requires couplings with all the important features built into the couplings designed by Thomas Engineers.

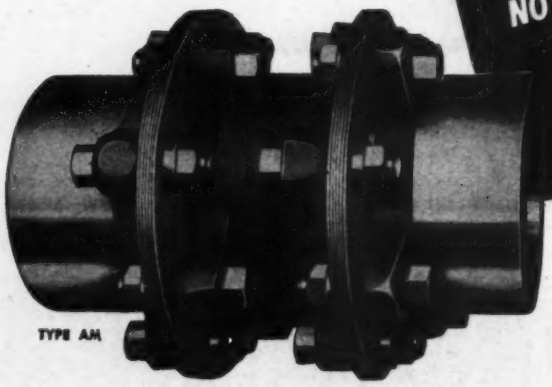
Thomas Couplings are in perfect balance under all conditions of misalignment.

BACKLASH, FRICTION, WEAR and CROSS-PULL ARE ELIMINATED

NO LUBRICATION IS REQUIRED!

Torsional characteristics remain constant regardless of length of service.

The Longer Life of Thomas Flexible Couplings, without costly interruptions and replacements will add much to Your Operating Profits!



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Thomas All-Metal Flexible Couplings do not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.

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Proportional type controller designed for precise control of pressure. It is stable and smooth in operation assuring accuracy and uniformity under varying conditions. It is available in ranges between 30 inches vacuum and 10,000 psi in non-recording and recording types. Standard proportional band is 1 to 100%.

We suggest you investigate plant-proved Masoneilan Pressure Controllers for your plant. They may be the answer to your problem. Write for information.

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Screwed or Flanged Patterns

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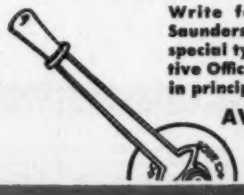
- ★ No packing glands to demand constant attention.
- ★ Non-rising stem eliminates breakage. Stem is protected from dust, weather and corrosion.
- ★ Working parts completely isolated from the fluid. No sticking, corroding or clogging to interfere with easy operation and tight closure. No contamination from valve lubricants.
- ★ Compressor and finger plate combine to support the diaphragm in all positions.
- ★ The large area of contact of the diaphragm on the seat, plus the resilience of the diaphragm, permits positive closure even when foreign matter is trapped.
- ★ No metal-to-metal seats to become damaged, wire drawn or scored. No refacing, reseating or grinding is required.
- ★ Streamlined passage without pockets reduces friction to a minimum and prevents accumulation of sludge and foreign solids.
- ★ The valve body – the only metal that could contact the fluid – can be completely lined with glass, porcelain, lead, rubber or synthetic compounds (flange type only) to suit service requirements.



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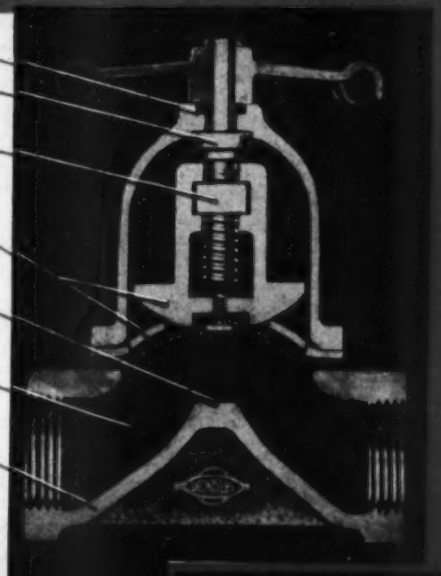
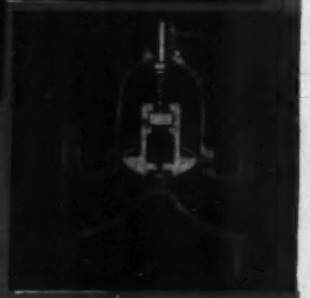
The "quick operating" lever design is one of several types.



VALVE OPEN

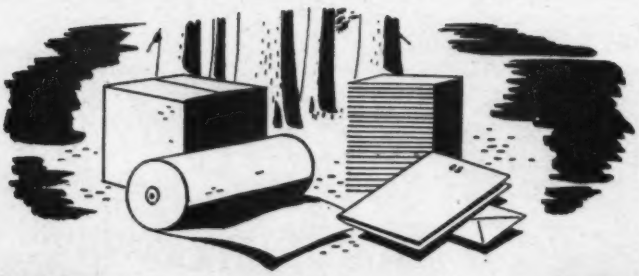


VALVE CLOSED

GRINNELL

FOUNDED 1850

WHENEVER **PIPING** IS INVOLVED



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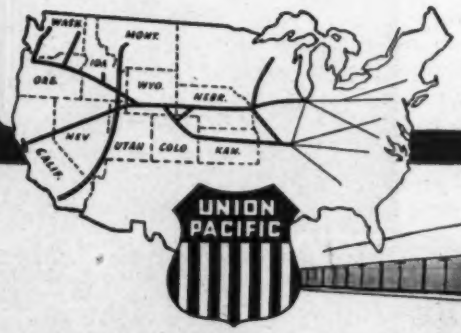

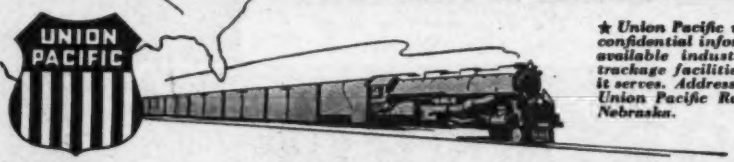

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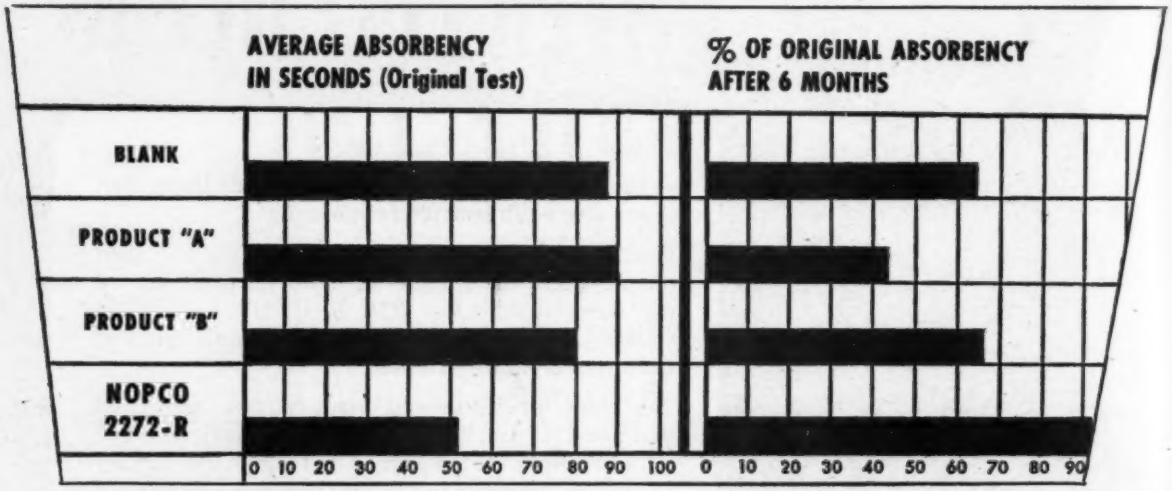
Here is news of great importance to every manufacturer of paper towels or tissue seeking new and better ways to step up absorbency. Comparative laboratory tests (see chart below) — amply verified by regular mill users — show that NOPCO 2272-R provides faster absorbency than other accepted absorbency materials — as well as longer retention.

NOPCO 2272-R successfully resists the natural tendency of paper to lose absorbency because it "stays with the fibers," thus assuring more lasting absorbency in the *finished sheet.* Manufacturers of specialty papers will also find NOPCO 2272-R particularly helpful because of its compatibility with solutions or dispersions of synthetic resins added to impart wet strength. Economical, too, — depending upon individual mill conditions, only one or two pints of NOPCO 2272-R needed per ton of stock. Write for further details.


AVERAGE ABSORBENCY IN SECONDS (Original Test)
% OF ORIGINAL ABSORBENCY AFTER 6 MONTHS
BLANK
PRODUCT "A"
PRODUCT "B"
NOPCO 2272-R
0 10 20 30 40 50 60 70 80 90 100
0 10 20 30 40 50 60 70 80 90

Report of the 6-Month Test

Sheets treated with three leading absorbency agents, including NOPCO 2272-R, and a separate group of sheets made from untreated stock were used in the tests.

Each product was added in the laboratory beater to stock composed of 300 grams of unbleached spruce sulfite and 200 grams of bleached aspen sulfite pulp dispersed with 12 liters of water. The stock was intentionally beaten to produce a harsh sheet, considerably below normal absorbency. Several hand sheets were made for testing purposes, following standard procedure.

Some sheets from each group were tested immediately for absorbency. Other sheets were tested at regular intervals for six months. Absorbency was measured by recording the time for 1 drop of distilled water to be absorbed completely into the sheet. Greater accuracy was assured, because these tests were the result of *natural* rather than *artificial* aging.

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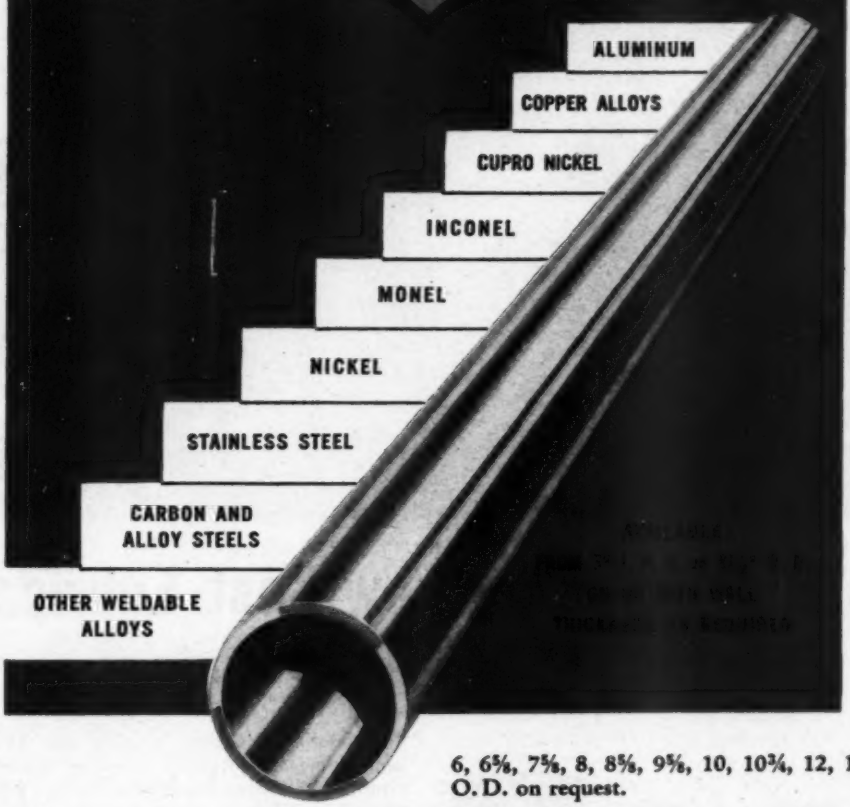
For Higher Absorbency

WELDCO
CORROSION RESISTING TUBING

LIGHT WALL



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ADVANTAGES . . . *You buy just as much effective corrosion resistance in a light wall tubing of corrosion-resisting material as you do in a heavy wall. Why pay for the extra metal when you don't need it for low pressures?*

STAINLESS STEELS . . . AISI Types: 302B, 304, 308, 309, 310, 316, 317, 321, 330, 347, and Special Chromium Nickel Steels.

ALLOY METALS . . . Cupro Nickel (70-30) Monel, Nickel, Alloy Steels, Inconel, other weldable material.

SIZES . . . Outside diameters: 3½, 4, 4½, 5, 5-9/16, 6, 6⅝, 7⅝, 8, 8⅝, 9⅝, 10, 10¾, 12, 12¾, and larger O. D. on request.

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LENGTH . . . Standard length is 10 feet on wall thicknesses under 3/16"; 12 feet is standard for 3/16" and heavier.

TYPE WELD . . . Submerged arc welding assures full penetration and is finished in conformity with the best practices to provide maximum corrosion resistance. All excess weld metal is removed from the interior of the tube.

Ask for the bulletin on Weldco Tubing, Fittings, and Fabricated Piping. Contains specifications, working pressures for different metals and other useful data. Mailed promptly.

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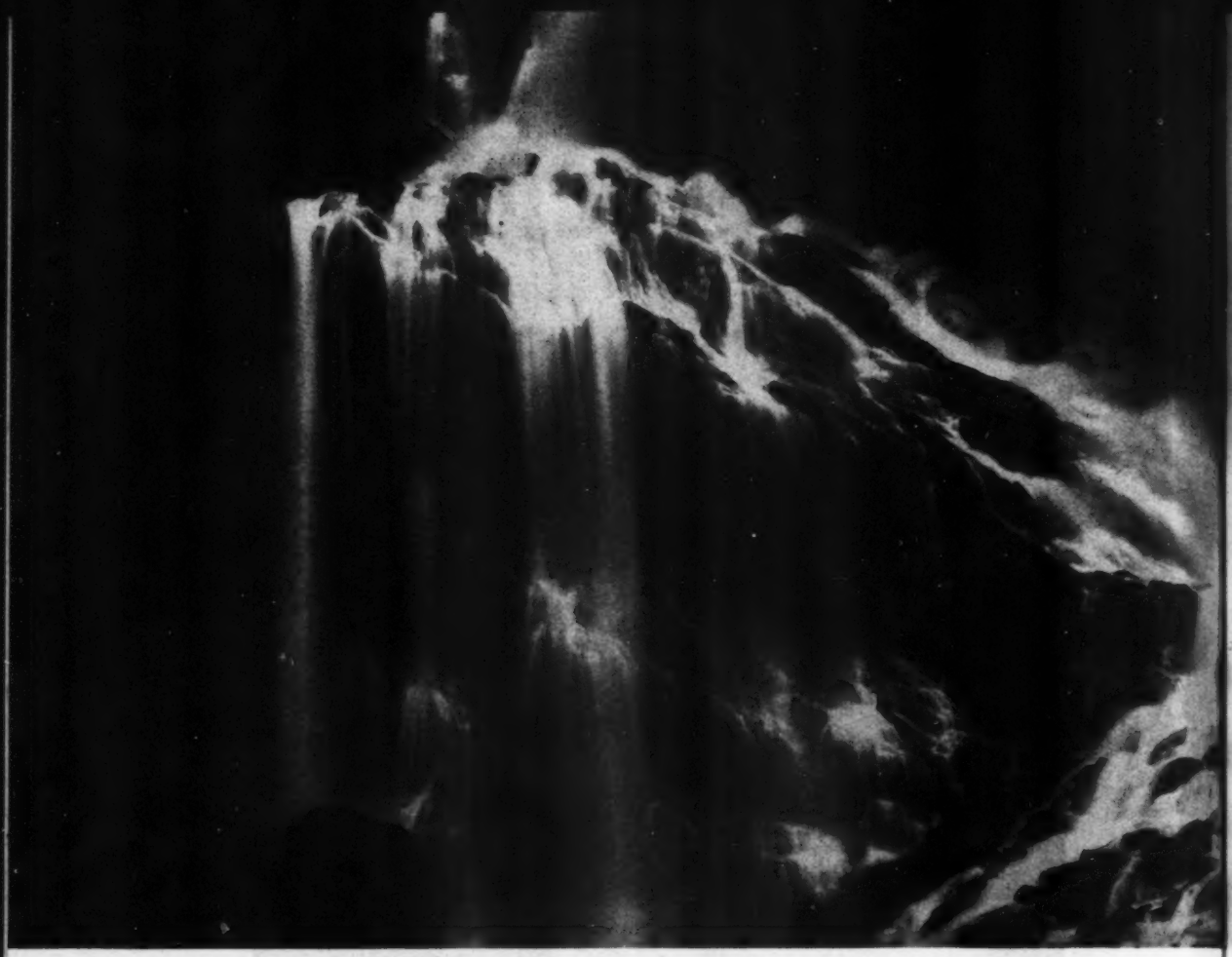
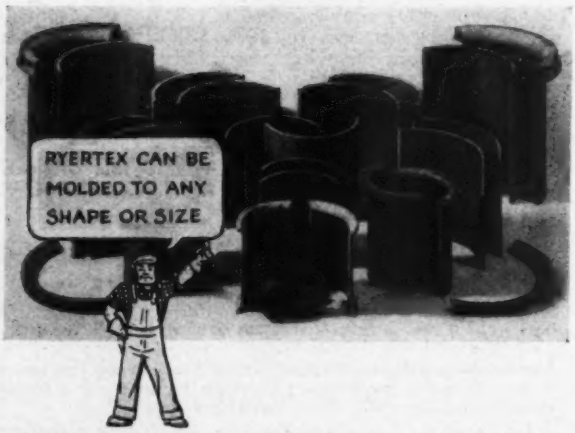


Photo of Nature's Low-Cost Lubricant

Best for Ryertex Bearings



● Ryertex applications include bearings for: Beaters, Washers, Grinders, Jordans, Refiners, Fourdriniers, Press Rolls, Calenders, etc., plus Ryertex Suction Box and Pipe Covers and Forming Boards.

Real bearing economy is yours with Ryertex. Because laminated-plastic Ryertex bearings operate at high efficiency with water lubrication only — slashing costs for lubricants and their application. In addition, by eliminating oil and grease that are a frequent source of specks in paper water-lubricated Ryertex reduces the chance of dirt spoilage — another economy.

It's only logical to use Ryertex at the wet end of paper machines where oil lubrication is difficult. And with Ryertex on press and calender bearings, water used as a coolant can easily serve as a lubricant as well.

Records of many mills prove that Ryertex bearings outlast bronze and babbitt 4 to 10 times. Installation is easy without radical changes in housings.

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OCTOBER, 1946

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E. E. FERGUSON, Dilts Machine Works
(Division of The Black-Clawson Co., Inc.)

▶▶▶ THE ADAGE THAT "papermaking is an art, not a science" is as true in wax paper conversion as it is in papermaking. In fact, many of the problems of wax conversion are brought about by the nonadherence to standards in papermaking, which are in turn the result of lack of absolute scientific control in the papermaking process.

Much has been said about the quality of paper furnished the converter by the papermaker. With all due respect to the papermaker, let it be said that he is handling a very complex process. Indeed, some steps in the process are not thoroughly understood by those practicing the art. It is quite safe to say, for instance, that there is no complete agreement among papermakers as to what actually takes place in the beater, or the jordan, or the Hydrafiner.

The converter presents his problems to the papermaker, who, in turn, honestly endeavors with the equipment he has, to translate the converter's desires into a sheet of paper. The degree of success attained by the papermaker is measured in large part by his interpretation of the converter's problems.

Because, as is in the majority of cases, the two do not talk the same, or a common language, and also because of a lack of understanding of each other's difficulties in obtaining a specification, important points are missed or completely misinterpreted. Indeed it is true that many converting operators have never seen the inside of a paper mill, nor have many papermakers visited, for study purposes, converting plants.

Without entering into a discussion of the many reasons for and advantages to be gained by a common meeting ground and language between papermakers and converters, it is suggested that a greater understanding of each other's problems should be developed through conferences and discussions on the scene of activity and between the operators themselves. Much benefit of a mutual nature would result from an honest endeavor to understand both processes and problems.

Between the process of papermaking and the finished waxed paper, is the waxing machine. It is composed of standard parts as is the paper machine. These parts, as in the case of the paper machine, are adjustable within certain fixed limits. Like the paper machine, many different grades of paper are produced from different furnishes. But because the application of wax to paper for any specification is largely a matter of absorption in one degree or another, and because the adjustments possible with the waxing machine to aid or retard this absorption are limited, the paper used must be "tailor made" for each specification. A study of the evolution of the waxing machine is interesting when one considers the relatively short period of time over which the development took place.

The intent of these comments is to review the methods of waxing paper from the beginning of the art and to evaluate the progress made in the evolution of the waxing machine. Comments and observations made on wax paper conversion will also be made.—AUTHOR'S NOTE

It would appear that one Stuart Gwynn, of New York, was the first to patent the use of paraffine as a saturant for paper, he having been granted letters patent for his discovery February 20, 1866. Gwynn states in his patent, however, that although his discovery dates prior to 1864, he was aware that "paraffine has been used in an imperfect manner and conditions for cartridge paper."

As a matter of comparison to modern methods, it is interesting to note that Gwynn recommended the sheet be wet with water first before saturation, "as then the heated paraffine will more readily enter the pores from which the water is expelled." Some present day converters maintain that the proper way to obtain a high degree of transparency in a sheet of sulphite furnish is to calender the sheet wet to the point of blackening, thus producing a sheet more readily saturated because of the displacement of the water by the hot wax.

Gwynn proposed using his discovery where "durability, imperviousness to moisture, and resistance to the action of acids and the elements are desired, as also for linings for hats, shoes, garments, and other articles of fibrous materials."

Siegried Hammerschlag, of New Jersey, is probably the father of the coating section of the waxing machine

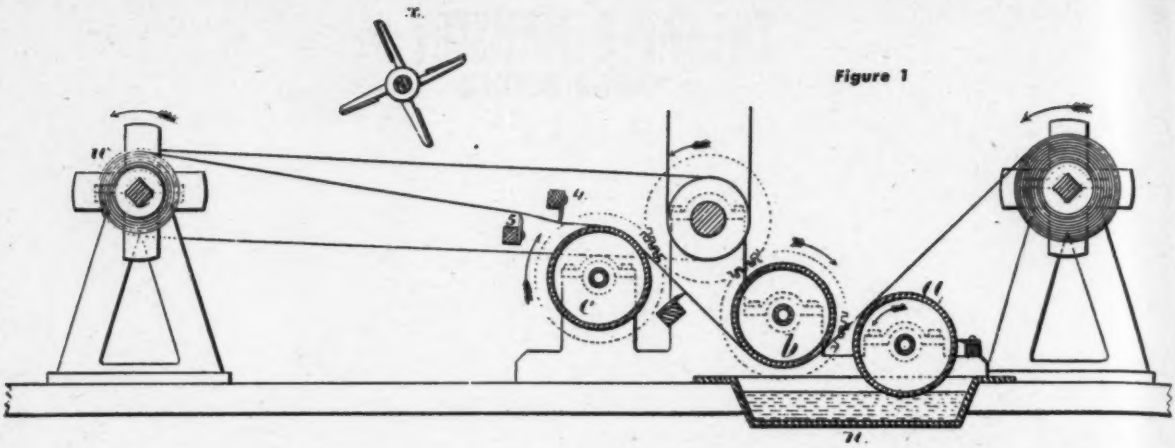


Figure 1

as it is understood today. In 1878, he was granted a patent for a machine (Figure 1) which applied wax to one side of the sheet by contact with a steam heated roll running partly submerged in a tank of molten wax, the speed of which was variable, thereby applying more or less wax to the surface of the sheet. He removed surplus wax by means of scrapers, and cooled the resulting product with a fan. However, application of wax to the paper was on one side only.

Later, in 1879, Hammerschlag was granted a patent on a machine (Figure 2) employing the use of two vertically mounted rolls: one—the bottom—of hollow iron to be heated with steam, the top being "India rubber, wood, or other suitable material," and "the journal boxes for the shaft of such rollers are in slides and provided with screws or weighted levers, by which the pressure of the rollers upon the paper as it passes through between the rollers may be varied as required." The sheet was passed under a roll immersed in the wax before entering the two pressure rolls, thereby coating both sides of the sheet.

In this patent Hammerschlag employed the use of three pipes over which the sheet traveled known as polishing pipes which acted in part to iron and smooth the paper as it passed over their surfaces. Apparently he continued to use a fan for cooling purposes. Thus Hammerschlag was the first to draw a sheet through a molten wax bath, squeeze the surplus wax off with a press section and smooth the sheet by drawing it over hot pipes.

Although their patent had to do with sheet and not roll feed and delivery, Norris and Vavra of Chicago were granted a patent (Figure 3) on June 25, 1901, using water as a cooling medium, thereby marking historically the first use of cold or refrigerated water as a medium to cool molten wax on paper.

What prompted the use of chilled water is not clear, but the observation listed indicates that these two men were quick to seize upon advantages of the water bath over previous methods. They found the wax chilled in this manner arrested "the absorption of the paraffine by the paper" and "that sudden chilling of the coating of paraffine has the further effect to give to the paper a smooth and glossy appearance, which is very attractive to the eye." They also observed that "the best results are secured with respect to the appearance of the paper treated, and the tenacity of the investment or coating when the paraffine bath is maintained at a temperature between 150 deg. to 175 deg. above zero Farenheit, and the chilling bath is maintained between 32 deg. and 40 deg. above zero Farenheit."

No statistical data are available to indicate the growth of the waxed paper market in the early days, but it is quite apparent that because of new uses for the product, its market must have enjoyed rapid expansion. Quality of product and speed of production inevitably became a factor in the industry. Properly cooling the paper saturated with the molten wax apparently was the part of the process of waxing paper needing perfection, which if properly solved would answer both the question of quality and production.

On December 13, 1913, Carter made application for a patent (granted May 25, 1915) for a machine (Figure 4) which ran a web of paper through a molten wax bath, over a set of "hollow heated smoothing or ironing rolls" (two of which turned in the opposite direction from the travel of the sheet) thence through a bath of cold water to chill or harden the wax. The residual water on the sheet, after leaving the water bath, was removed by an air blast aimed in the opposite direction to the travel of the

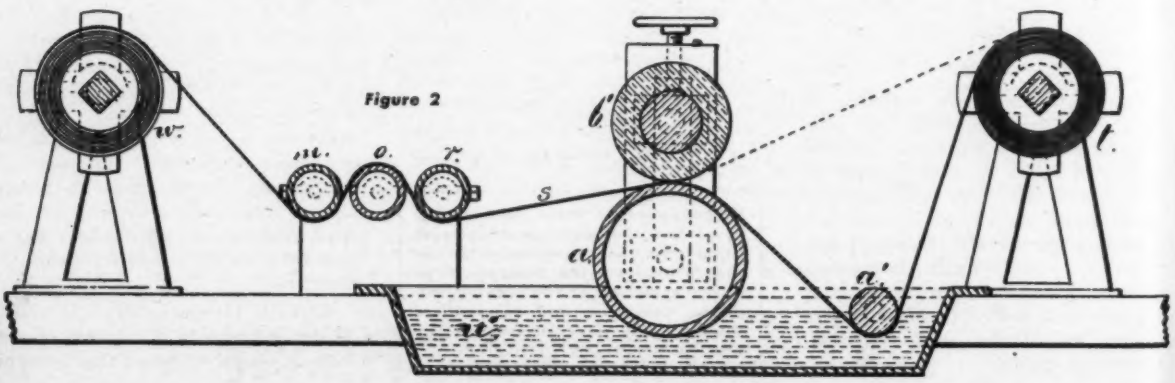


Figure 2

web thereby blowing the water off.

The speed of the water-cooling machine was further increased by a device patented by Decker and Van Sluys on July 19, 1921. This machine, according to the patent, removed the water in part, adhering to the sheet after immersion in a water bath for cooling by "vibrating devices consisting of smooth transverse rods bearing against the face of the paper," and controlled by electric vibrating motors. From the vibrators, the sheet traveled through a set of scrapers, thence over suction pipes, "bearing against the face of the web." It was claimed that "the water, instead of being blown away from the surface of the paper by the force of an air blast is removed more effectively by one or more suction pipes bearing against opposite faces of the paper web."

In a further attempt to increase the quality of the product produced as well as the speed of the waxing machine, Carter patented and used a set of four cooling rolls. This patent was granted September 26, 1922. Liquid from a small refrigerating plant was used to keep the rolls at proper temperature.

The methods of the manufacture of waxed paper which are largely held to be standard procedure had, at this point, been conceived and patented. Other patents were issued in interim between Hammerslag and Carter, having to do with processes of wax application to papers other than the orthodox machine of today. It is also true that modifications of the machine have been perfected and patented since Carter, but the basic principle of dipping the sheet in wax, squeezing or metering the amount left in or on the sheet by squeeze rolls and smoothing the coat with smoothing rolls, then cooling by means of either water bath, or cold roll, or both, remains the same.

Up to this point, in the squeeze roll type of machine, the inventions and construction of waxing equipment had come from the manufacturers of waxed paper. Howard, an inventive machinist, not directly associated with the waxed paper industry, but one who had a great deal of experience in building waxes, recognized the need for better engineered and more economical equipment for the industry.

In his patent issued December 19, 1939, Howard claimed the perfection of an apparatus which was at once daring and unique. He removed the water from the sheet by a scraping action, subjecting the sheet to a travel over a series of sharp knife blades, mounted on either side of the sheet, the knives being positioned at such an angle so as to shave the water off. Howard disposed of his patent rights to The Black-Clawson Company, and this firm, in turn, gave the rights over to Dilts Machine Works.

The Howard water removal apparatus, when installed on a water finish machine, eliminated the factor of water removal from the sheet at high speeds. It was discovered, however, that in the construction of supporting elements of the machine, much had been left to be desired. In order that a machine might produce a water finish sheet from a squeeze roll type of machine, with close adherence to specifications and within the limitations created by the inequalities of the paper supplied, it was necessary to engineer and design a machine that would accurately control the complete waxing operation.

Exhaustive tests and studies proved that the speed with which the Howard apparatus would efficiently remove water was somewhere between 1000 and 1500 fpm. Using the basic principles and discoveries which had been patented in the early days of the industry, a machine was designed which would embody the best in modern day engineering principles.

Mention has been made of the squeeze roll type of machine. This type employs two or more rolls mounted and running exactly vertical to each other. The bottom roll is usually built of iron while the top roll is a composite roll having an iron core with about an inch of rubber as a covering. The purpose of these rolls is to meter or measure the amount of wax or other coating to the sheet by the pressure exerted at the point of contact or "nip" of the rolls. There are other methods of application, but these observations are strictly on the squeeze roll types of machine.

Six important factors control the amount of coating applied to the sheet when coating it with squeeze rolls:

1) Speed of the sheet in relation to the peripheral speed of the squeeze rolls
2) Speed of the machine
3) Pressure exerted on the bottom roll through the top roll
4) Density of the rubber roll
5) Temperature of wax
6) Character of the sheet

Figure 3

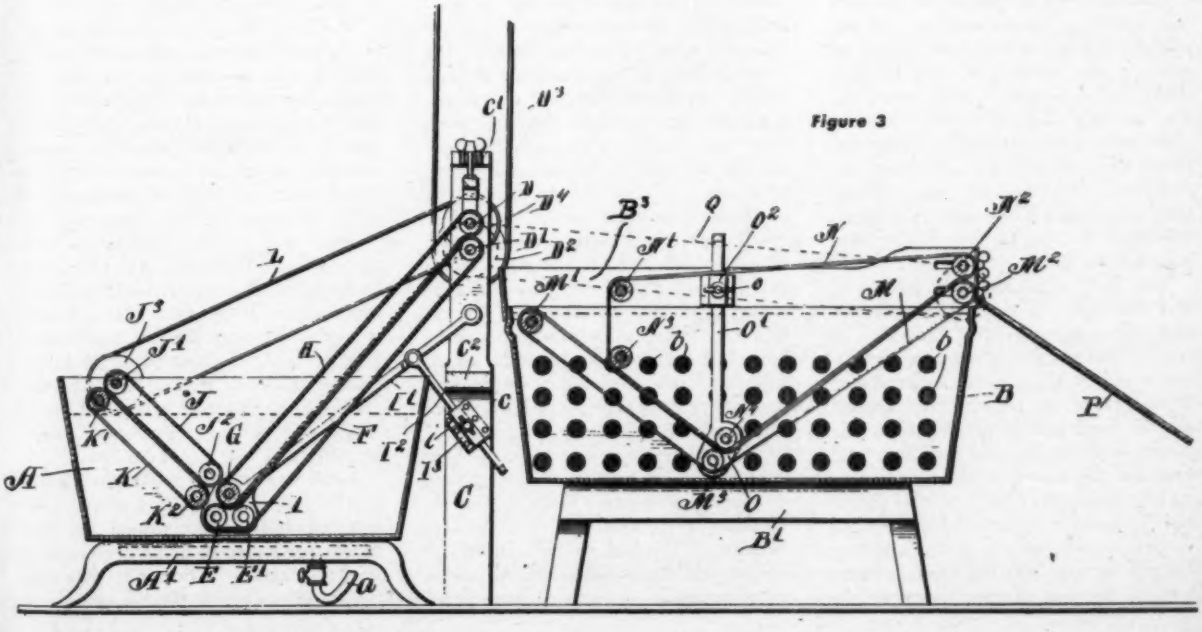
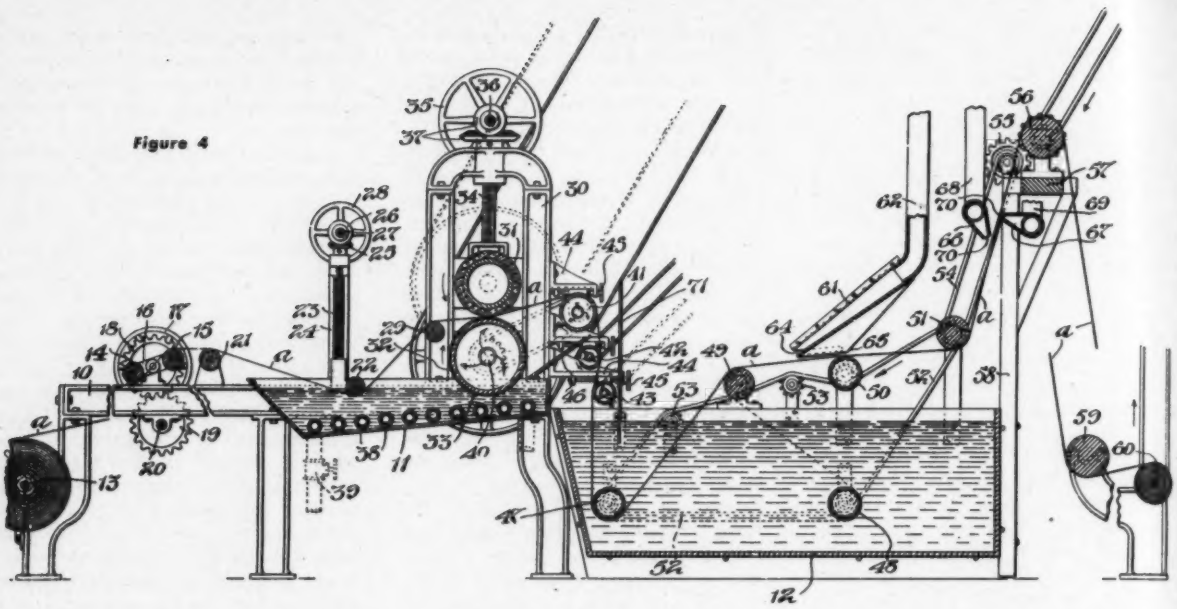


Figure 4



All factors are closely related and are very important to the production of controlled quality.

The machine is designed to give the operator the maximum assistance possible mechanically in the control of the quality of the product he is producing. Efficient operation, however, is achieved by the skill of the operator, his observation of and ability to make those adjustments necessary to compensate for the changes in conditions over which he has no control.

The importance of the relation of the speed of the sheet to the peripheral speed of the squeeze rolls cannot be exaggerated. The two speeds must be identical at all times.

Specifications for paper of the surface wax type (bread wrapper, for instance) call for a high percentage of wax on the surface of the finished sheet. It is necessary, then, that the wax on the surface of the finished sheet be carried through the nip between the sheet and the surfaces of the two rolls creating the nip. Under these conditions, there can be no positive grip by the nip of the squeeze rolls on the sheet.

Hot wax is acting as a lubricant, and the sheet, if the machine is not skillfully operated, has a tendency to travel slower or faster than the peripheral speed of the squeeze rolls; slower if the force of the friction applied on the feed roll is greater than the power exerted by the winder, and faster if the reverse is true.

The immediate effect of this variation in speed is to create a differential in the pressure of the wax carried to the nip by the sheet, the pressure being created by and in proportion to the speed with which the wax is carried to the nip by the sheet. It is obvious, therefore, that after the proper pressure has been exerted mechanically; i.e., the pressure of the top to the bottom roll, it is important that wax pressure be "kept in step" with the adjustment. The installation of constant tension devices for both unwind and rewind rolls reduces the tendency of the sheet to run out of step with the squeeze rolls; it also reduces the number of breaks due to faulty application of friction.

When the speed of the sheet and the speed of the machine are equal, the pressure at the nip is mechanically adjusted and held to compensate for the pressure of the wax at the nip. In general, it will be found that a "tighter squeeze" must be exerted to keep the coating down to specifications at high speeds. It is also true that due to inequalities in the paper supplied (uneven basis weight across the sheet, resulting in uneven drying and calendering), it is necessary to change the mechanical pressure on the nip relatively—that is, to exert uneven pressures on both ends of the nip. Much can be said about the inequalities of paper furnished converters and the relation of these inequalities to his problems, but suffice to say here that much can be done to eliminate difficulties not of the converter's making, certainly not his choosing.

The old pressure screw spring type of pressure application was found to be inadequate because there was no indication of the actual load at the nip. Because of the lack of indicated load, abuses, and often injuries to the equipment resulted. A rubber-covered roll, which is one of the components of the squeeze roll section, running in a temperature of—say 170 Fahr., is a delicate piece of mechanism; its life or usefulness is dependent upon its use within bounds of its limitations.

In order to compensate for inequalities in paper, operators quite often adjust the nip pressure beyond the ability of the rubber covering "to take it." Such adjustments frequently result in injury to the rubber covering simply because of no indication of the amount of pressure exerted. Therefore, a loading device, air-operated, has been built into the squeeze roll section with appropriate indicators which measure and record the amount of pressure exerted on both ends of the nip.

With this device it is possible to tell at a glance how much pressure is being exerted, and observations by the operator can determine whether or not the pressure is producing the desired results. He is also in a position to know whether or not he is approaching his "load limit," as well as being able to judge whether or not more or less pressure will benefit a condition he is attempting to correct. An added advantage of the measured and recorded nip pressure is the fact that a record is kept of pressure used on a particular type or grade of paper to which reference is made on future runs, thereby eliminating the old trial and error method of getting the proper coating by weight.

Little can be said about the density of the rubber roll. The density is determined by local conditions, the final figure being arrived at by a method of trial and error. While it is true that figures are available for the density of

rubber to be used for a certain coat, it is also true that the figure might not produce the proper coat to suit the paper being supplied. This is due to individual paper characteristics sometimes created by the converter in his specifications to the papermaker. In general, however, a relatively soft rubber covering will apply more wax to a sheet than a harder covering.

What Norris and Vavra stated in their patent concerning wax temperatures in operations holds true today. Temperatures between 150 and 170 Fahr. are average for good operation, and there should be no deviation from a set temperature for a given sheet specification if there is to be no deviation from standards as effected by wax temperatures.

Opinions on the character of paper to be used to accomplish certain results are varied and the subject is controversial in nature. The characteristics of the unwaxed as well as the waxed sheet are often laid down in specifications by the converter's customer. In such cases, the specifications are the result of laboratory tests of a sheet found to be suitable for the purpose.

These specifications may be difficult to match. The converter is not always able to match the sample from his source of supply. As stated before, the converter's basic problem is usually one of absorbency, and the opinion is that the degree of absorbency is to a large extent dependent upon the degree of freeness in the paper, as well as to some extent sizing and calendering.

Specifications, written or implied, having to do with folding qualities, pigment content, greaseproofness, transparency, moisture, vapor-proof, permeability, papers for foil backing, as well as papers to be used with amorphous waxes and plastics demand a wide variation of stock preparation for the manufacture of the papers used. Hence, no two papers processed on a waxing machine are identical in character. Waxing machines, therefore, must be built with the full knowledge of the fact that the machine must be capable of operating efficiently with a wide variety of papers.

Two methods of cooling the wax on the sheet are available: (1) the sheet is run through a bath of refrigerated water; (2) the sheet is run over two or more refrigerated rolls of large diameter. Each method produces different results in the finished product and both methods have a definite place in the construction of the waxing machine as a unit if the machine is to be capable of maximum utility.

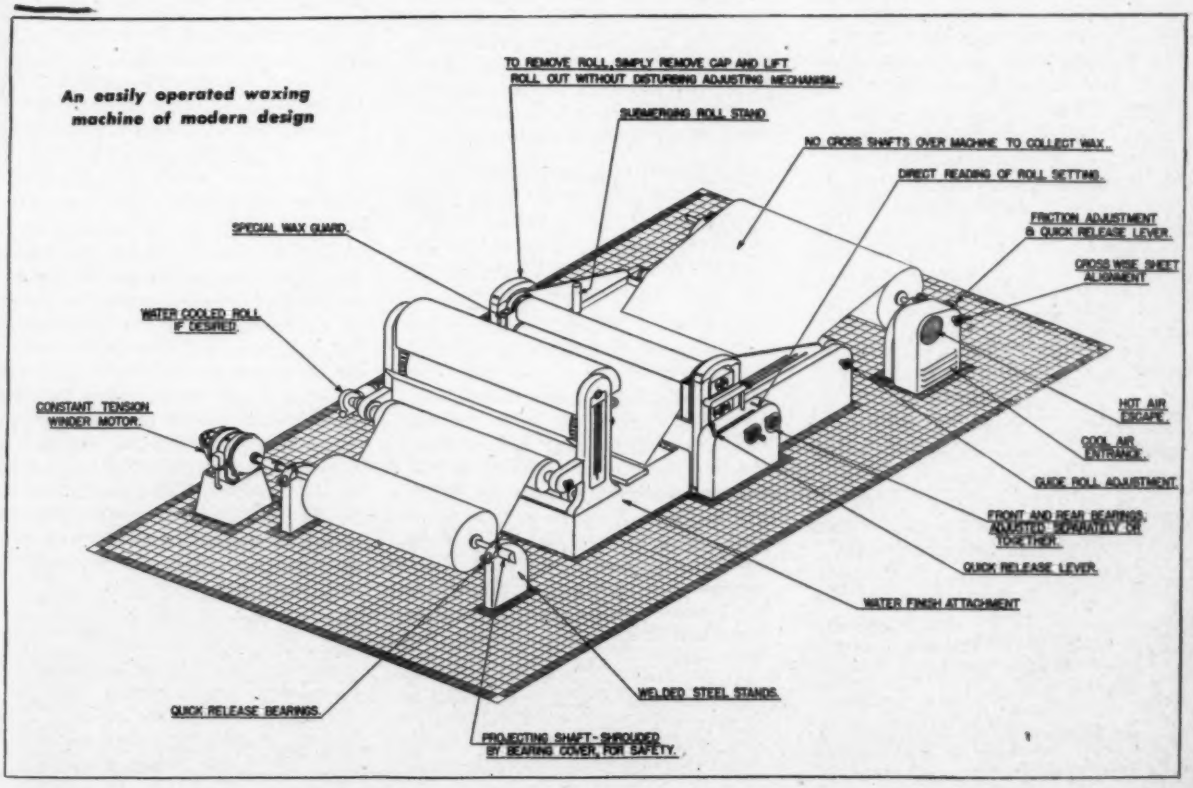
Basically, the essential difference in the two methods is the fact that the water chill is much quicker in action, and therefore faster in operation. Although results produced from a quality point of view are different in the two methods, cold water producing a high sheen to the coat, and cold roll a relatively dull finish, the reason for the difference also lies in the relative rate of cooling produced by the two methods.

The method of cooling by water bath is relatively simple. The sheet is drawn, after leaving the squeeze rolls with a coating of (more or less saturated by) hot wax, through a bath of refrigerated water. Operating temperatures of this water are in the vicinity of 40 Fahr. The action of the water in cooling is instantaneous since *all* of the sheet is at once subjected to the coolant and sufficient draw or dwell of the sheet is provided in the water to reduce the temperature of the waxed sheet to that temperature required in the finished product. However, when the sheet has been cooled, the problem of removing the water from the sheet becomes immediately apparent.

Water is removed by squeezing, by suction, and by scraping.

When squeezing, the sheet is passed through a set of two rubber-covered rolls and the action of this method is akin to a wringer. Water removal, however, is not 100 per cent and in most cases is objectionable because of this fact.

Some machines employ the suction method whereby the sheet is drawn


TO REMOVE ROLL, SIMPLY REMOVE CAP AND LIFT ROLL OUT WITHOUT DISTURBING ADJUSTING MECHANISM.
SUBMERGING ROLL STAND
NO CROSS SHAFTS OVER MACHINE TO COLLECT WAX.
DIRECT READING OF ROLL SETTING.
SPECIAL WAX GUARD
FRICTION ADJUSTMENT & QUICK RELEASE LEVER.
CROSS WISE SHEET ALIGNMENT
WATER COOLED ROLL IF DESIRED
CONSTANT TENSION WINDER MOTOR.
HOT AIR ESCAPE.
COOL AIR ENTRANCE.
GUIDE ROLL ADJUSTMENT.
FRONT AND REAR BEARINGS ADJUSTED SEPARATELY OR TOGETHER.
QUICK RELEASE LEVER.
WATER FINISH ATTACHMENT
WELDED STEEL STANDS.
QUICK RELEASE BEARINGS.
PROJECTING SHAFT - SHROUDED BY BEARING COVER, FOR SAFETY.

An easily operated waxing machine of modern design

over a series of perforated tubes connected to a vacuum pump. The action of the air currents created by the vacuum at the perforations in the pipes over which the sheet is drawn pulls the water off the sheet.

This method is limited in its effectiveness by the amount of vacuum developed and applied. The system also is relatively elaborate since it is necessary to be able to quickly "deckle in or out" the suction pipes to compensate for sheet widths. A high speed fan type of vacuum pump and a water collector likewise are necessary. All this equipment requires constant checking and maintenance against possible leaks and resulting vacuum loss.

Much greater speed of operation is attained by cold water bath than is possible by cold rolls. This is due entirely to the fact, as stated above, that the water bath chills the sheet all over and at once while the cold rolls chill first one, then the other side of the sheet.

Probably no one unit of the machine is so simple in operation and effective in its duties as is the Howard water removal tower. It has been said that the speed with which the water is removed from the sheet is in excess of 1000 fpm. This has been proven by actual sustained performance in the industry.

Explanations of the operation are numerous and varied, some having to do with the behavior of air currents and resultant pressures, while others theorize or explain the action by the principles of cohesion. Certain it is, however, that all the water is taken off the sheet, and that because this is true, the answer most probably lies in the statement that the water is simply shaved off.

The sheet is caused to travel downward against two banks or sets of twenty-four knives, twelve to a bank; one set operating against one side of the sheet, and the other against the opposite side. The knives are set at an angle and the edge is so tooled that drainage after the water has been shaved from the sheet is effected. Occasional replacement of the knives is the only item of maintenance necessary. No operating expense is incurred since the travel of the sheet produces the water removal action. No suction is involved. Therefore, no initial investment for air pumps and supporting equipment is necessary.

The result is a streamlined, easily-operated machine, the efficiency of which at high speeds is unquestionable.

Flames and Inflation*

G. H. RYLANDER, Underwriting Manager
Allied American Mutual Fire Insurance Co.

▶▶▶ AMERICA is eating, sleeping and talking inflation these days. The public mind has been loaded with inflation facts and figures and trends and predictions. Every alert business man has done some fact-sifting to determine the relation of rising values, high costs and the decreased purchasing power of the dollar to his interests. Under present conditions, he knows the need for constant vigilance on the current values of raw materials, machinery and equipment and other items that require replacement.

What of the possible replacement of property holdings? Often overlooked in toting up the economic balance sheet, the substantial rise in value and replacement costs of existing properties holds a real potentiality for financial loss.

A large percentage of property losses will result from fire. Statistically speaking, the chances of suffering a loss by fire are greater today than they have been since 1929. Fire losses have climbed steadily in the past five years and are still climbing. A fire under the inflationary tendencies of today will entail a substantial financial loss to the owner and to the occupant if fire insurance coverage has not kept pace with climbing costs and values.

Today's business man hardly needs to be told the current market situation in the building field. He knows that if he contemplates building today he must purchase materials and labor at the current market.

He knows that construction costs and prices of construction materials reached their highest levels in 25 years at the beginning of 1946. There are indications that they will go even higher. He knows that current shortages in construction materials are every bit as important as their prices. This will make building slow as well as expensive. He is well-versed on the labor market. He knows that labor costs, too, are up and will probably be higher. He knows that today's labor productivity is low; in the construction industry, it lags as much as 65% behind 1939 levels in some areas.

All these factors are equally applicable to the replacement of existing buildings. With this common knowledge, certainly no prudent business man can afford to be without adequate fire insurance coverage.

Such is the real estate boom, that cases have cropped up where industrial property purchased a few years ago for say $22,000 has gone on the market with a $300,000 price tag and found willing takers. Perhaps these extreme cases are rare but they do define the sharp upswing in real estate values. The National Association of Building Owners and Managers say that building rental income has soared enormously. They report that in some areas leases were up to as much as $6 per square foot, a figure not seen since the twenties.

This spectacular advance in relative values accents the need for appraisal to determine the necessary increase in fire insurance protection. Appraisals should be made of all buildings, old and new, by a competent contractor or builder well-versed in present reproduction costs. Along with this estimate it would be well to check inventories of raw and finished stock, and compile replacement values of all items of equipment: process installation, production and maintenance machinery, lower plant, materials handling devices and vehicles. Without this revaluation to use as the basis for adjusting fire insurance protection, the owner is quite unprepared to meet high losses that may result from fire.

Financial loss due to inadequate fire insurance coverage applies not only to total losses but to partial losses under the co-insurance clause. A co-insurance clause is an agreement by policyholder to maintain his insurance up to a specified percentage of the actual value of the property.

The financial loss under a co-insurance clause may be considerable if the policyholder fails to keep his insurance adjusted to the amount required by the agreement. He will be able to collect only a part of his loss. For example, an owner who five years ago was adequately insured by a $40,000 policy with an 80% co-insurance clause might well find that the present value of the property is $100,000 instead of $50,000. Then, in the settlement of a $10,000 partial loss, he would be entitled to receive only half of the $10,000 claim or $5,000.

It is false economy for any property owner to view his fire insurance coverage today as providing for a remote possibility rather than a portentuous probability. Under present conditions, adequate fire insurance coverage may rightly be called the keystone of the property owner's financial structure.

(*)Excerpted from an article under this title which appeared in the *American Mutual Magazine.*

Traffic Suggestions for Production Executives

C. E. JONES
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While the Traffic Department of the Southern Kraft Division of International Paper Company covers the entire field of rates, service, etc., from the points of origination of the raw materials to the customers' warehouses throughout the nation, this article deals only with those traffic and transportation problems primarily affecting production. Thus circumscribed, it outlines the functioning of the traffic department of the eight mills of the Southern Kraft Division in the South and Southwest as one of the seven principal departments of the company. The other departments are: Manufacturing (including labor contracts and personnel), Wood procurement, Purchasing, Accounting, Land acquisition and management thereof, Public Relations. AUTHOR'S NOTE

▶▶▶ THE INITIAL AND controlling factor in the functioning of an efficient traffic department is an understanding and co-operative executive personnel to which the department reports.

Transportation charges on all raw materials are a definite part of production cost; therefore, management is interested in whether these transportation charges are reasonable *per se* and relatively aligned with competition. To get these facts is one of the first important responsibilities of a traffic department. When one considers that it takes from four to five tons of raw materials to make one ton of finished products in the paper industry, it is easy to realize that transportation becomes one of the controlling cost items in production.

The traffic department constantly must be on the alert to help in the development of new sources of supply of raw materials. It also must see that rates are established which will enable the use of these new sources of supply and still keep the company competitively aligned. The traffic department, therefore, must know in a general way through information gathered from time to time as to the source of supply of raw materials of competitors. Particular attention and study must constantly be given to those rates and sources of supply which formulate the base rates for shippers who equalize.

In the procurement of pulpwood, which is the most important raw material used by the paper industry in the South and Southwest, the traffic department must provide the rate structure which will enable the mills to procure wood from wide areas at reasonable transportation costs. In handling the rate structure on pulpwood, it must be borne in mind that the larger the area provided for by a particular mill to procure its pulpwood, the less likely the supply is to be interrupted by weather conditions. Also, a large area of supply enables the practicing of proper wood cutting and conservation rules, thus obviating the necessity for intense cutting of the area adjacent to the mill.

None of the paper mills in the South and Southwest obtain their wood supply exclusively by rail. Therefore, the handling of traffic and transportation in connection with wood procurement also involves the establishment of economical private truck and barge service.

Right now the pulp and paper mills in the South and Southwest are experiencing a very hurtful car shortage in connection with the movement of pulpwood. Unfortunately, quite a few of the railroads look upon pulpwood as dead freight which can be moved after other commodities of a higher grade have been moved.

All of the carriers in the South and Southwest are being urged daily to increase their wood rack car supply to the point where this special type of equipment will be adequate to accommodate the entire pulpwood movement. This accomplishment is listed as a most important objective. In addition to relieving the adverse effects of an inadequate car supply, its realization would bring about a substantial operating economy. The cost of mechanically unloading at the mills from rack cars is considerably less than manual unloading from closed equipment.

It is the responsibility of the traffic department to participate in the research and surveys preceding the purchasing of land for forestry purposes in order that purchases will be made at points where transportation by rail, water or truck is favorable when the timber or wood is removed. It also is the responsibility of the traffic department to see that forest land is not acquired on short lines, branch lines, or weak railroads which may be abandoned in the future because of inability to earn a fair return.

There is an important place for the traffic department in the field of public relations. It has always been the policy of the management of the Southern Kraft Division to financially support and work co-operatively with all civic agencies interested in community and state life wherever it operates. Most all of these state, local and regional associations have transportation committees and engage in transportation activities, particularly from the standpoint of broad transportation policies, including legislation. The traffic department has always been active in these affairs because the company considers it a responsibility to contribute toward a clear and full understanding of transportation as an industry and to help formulate a sound legislative program. However, it is believed that this general phase of transportaton work is being neglected by industry generally.

Too many executives are prone to look upon their traffic departments as strictly a service department. Fortunately, some executives have no such conception. However, service is an important aspect of the work of any traffic department, particularly to mill production executives.

The manufacturing department, for example, wants to know daily the condition of its raw material inventories. If these inventories are not what are considered adequate, it wants to know what is in transit, the origins, and probable dates of delivery. The traffic department must have this information available, because quite frequently production may be switched from grade to grade, depending upon the raw material inventories and anticipated deliveries of raw materials.

A raw material which requires daily watching is pulpwood. If, for instance, the Georgetown (S. C.) plant operated exclusively on rail wood, it would receive approximately 180 carloads per day.

The manufacturing department must know the amount of wood on hand daily at the various mills as well as the anticipated receipts for the next twenty-four hours in order to intelligently schedule production. This information is needed particularly when wood inventories are low. It is the responsibility of the traffic department to have this data available for the

manufacturing department on all the mills.

Another important service in which the manufacturing department is vitally interested is to ascertain whether cars will be available for movement of the tonnage after production. Paper generally is loaded directly into railroad cars as it comes from the finishing room. When warehousing is necessary because of inadequate car supply, it involves considerable money and also inconvenience to customers. It is the responsibility of the traffic department to work with the various wood dealers in the procurement areas to see that they are adequately supplied with cars. In fact, traffic service agents are located at the important mills of the company. These agents devote most of their time to the handling of problems of wood shippers and wood dealers, primarily from the standpoint of an adequate car supply.

The closest co-operation must exist between the order and traffic departments. They must be virtually one and the same. When a traffic department is functioning for a group of plants with different locations, transportation cost becomes one of the controlling factors in determining to which mill particular orders will be assigned for production. Entering into this selection, however, is a long list of considerations: such as the capacity of the mill and the orders already on hand, customers' desired schedules of shipments, the extent to which customers' specifications can be met at a particular mill without too much waste from trimming, etc.

Another important service of the traffic department is to prepare for the accounting department of the various mills complete rate tariffs. These tariffs set forth correct rates and routes to be used in the auditing of freight bills before payment is made. The incoming charges, from the standpoint of accuracy, also are subsequently re-audited by the traffic department in order to avoid any leak here.

Mention has been made of only a few of the important things which a traffic department must handle on its own initiative in the performance of its duties from the standpoint of mill production.

There are, of course, other important aspects. Among them are: rate structure on outbound finished products which will enable national distribution on a fair competitive basis and service to customer on outbound shipments.

Supplementary Summer Cooling in Paper Machine Rooms

L. G. JANETT
J. O. Ross Engineering Corp.

▶▶▶ "HOT - AND - MUGGY" is often synonymous with "machine room" in a paper-mill employee's mind. Certainly this factor is coming to the fore in employee relations at this period. Heretofore the general rationalization has been made that in order to dry paper hot dryers must be used, and if production is to be maintained one must forego comfort. This contention can be and should be modified.

In addition to the comfort concept, the mental and physical fatigue resulting from high room temperatures reduces worker efficiency so that it may be said without proof that the average machine time lost due to breaks increases with hot machine room conditions.

To analyze what can be done to improve comfort without hampering production requires looking into heat flow from its sources.

A paper machine installation condenses anywhere from 1.8 to 4.5 pounds of steam per pound of paper dried, including auxiliary machine room steam uses. For example, a 100-ton machine could involve condensation of 25,000 pounds of steam per hour, or roughly a release of 25,000,000 Btu per hour. This heat quantity would comfortably heat 75 small homes in below freezing weather. The greater portion of the heat released in the dryer section by condensation is transferred by conduction to the wet sheet to evaporate the water from it. Air convection around the dryers results in transfer of the heat to the humid air which must be exhausted from the room.

A well-hooded machine with adequate exhaust volume results in practically all forced air convection currents to be in a direction *toward* the dryers and upward into the hood to the exhaust fans. Despite such positive air and heat flow a machine room in summer may still be hot and uncomfortable.

The reason for high machine room temperatures, even though machines are well hooded and ventilated, is the relatively high quantity of heat reaching the working areas by means of a combination of radiation from the machine and the conduction of heat throughout all machinery, resulting in secondary reflection or re-radiation of the energy. Uncomfortably high body temperatures of workers result.

An infrared lamp gives off radiant energy with which we are all familiar. Too often we overlook the fact that a black steam line radiates a great deal of this same energy, even though we cannot see any glow. As a locomotive slowly passes a railway coach on an adjacent track a passenger can feel an instantaneous flow of heat to his skin even though the coach windows are tightly closed. The radiant energy from the dryer heads and surfaces, the machine frames, gear drives, calenders and any other machine or building element which is hot, travels with the speed of light to a man's body in its path. The amount of energy radiated is a direct function of the temperature of the radiating part. Approximately half the heat lost by a dryer head is radiant energy, the remaining half being convection loss.

The reduction of heat gain by the workers in operating areas could be reduced by the following measures:

1) Enclosure of the dryer section
2) Painting or finishing primary radiating surfaces with aluminum or equivalent
3) Insulation of dryer heads
4) *Over-ventilation* of the working zones

Enclosing a dryer section has been attempted with the result that diffi-

Fig. 1—Paper machine summer cooling air supply (photo courtesy Rhinelander Paper Co.)

culty was experienced in handling dryer wraps, threading, and making machine adjustments and repairs. This procedure definitely improved room conditions but the practical factors showed reduced production due to impediments and reduced accessibility.

Many mills have painted their dryer heads with aluminum paints with success. The convection losses remained the same over the head surfaces but the heat radiated from the surfaces was materially reduced. For example, a dark, roughly oxidized cast iron dryer head can be said to have a radiation factor of say 0.95. An aluminum-finished steel surface will have a radiation factor of approximately 0.53 by comparison. In other words, an aluminum finished dryer head has a radiation capacity of roughly half that of a dark, oxidized head.

To go further, properly insulating dryer heads can greatly reduce the convection losses of the head as well as the radiation losses. A recent installation of dryer head insulation has been completely justified in heat saving alone, aside from the improved comfort considerations.

Over-ventilation of working areas has proven to be an additional successful measure. Over-ventilation may be defined as the supply of excessive quantities of air above the requirement for fresh air supply at high velocities to strike workers at their operating stations at dry end and wet end of the machine. In air conditioning an office it is axiomatic to eliminate perceptible drafts, particularly of air supplied at temperatures below room temperatures. Papermakers, on the other hand, have not objected in the least to excessive velocities striking them. Actually these air movements cannot prevent radiant energy from striking a person's body because radiant heat does not travel by the medium of convection; the air serves to carry heat from the body no matter how it is gained.

A typical modern application of a summer cooling system can be described wherein useful winter utilization of the system also results.

Two fairly large supply fan units including heater coils are located in the machine room basement at wet and dry ends respectively. During the summer, outside air from these units is distributed through a number of removable ducts extending from four to five feet above the machine room main floor level. These duct distributors are located at the dry end and wet end in the center of the aisle and direct the air *horizontally* toward the work stations around fourdrinier, calendars, reels and winders. The outlet grilles are provided with deflector louvres to give flexibility of direction and velocity control to suit the workmen.

For summer cooling, if the mill fresh water supply temperature is between 54 to 60 Fahr., this water can be taken through the heater coils without contamination before being used in the mill to reduce the air temperature supplied to the working zone by approximately 10 Fahr.

During winter operation, the major part of the air supply from the fan units is diverted through louvres to the basement, pre-heating the air with steam in the heater coils under thermostatic control. This winter supply serves to keep the basement dry, with all air passing over bottom felts up through the dryer section for improved machine ventilation and retention of mill air balance.

Figure 1 illustrates a summer cool-

ing supply with an alternate type of diffuser outlet directing the air downward as well as horizontally.

Additional exhaust capacity from machine room areas in addition to hood exhaust is also indicated, which will improve general room conditions, but the basic fact often overlooked is that as much and more comfort can result from deliberately pushing fresh air to exactly where it is needed than by exhausting from some remote point. Exhaust air rushes to a fan from all sides including areas which need not be cooled.

"Reluctant to invitation, amenable to compulsion" is a jocose phrase expressing air flow by pressure difference from a specific small area far from the point of exhaust or control.

Each mill has its own individual circumstances and problems of comfort which can be attacked with the above basic concepts to modify the rationalization "To dry a lot of paper it has to be uncomfortable for workmen."

Manufacture of High Alpha Pulps in Wartime Germany

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▶▶▶ THE USE OF WOOD as a raw material for high alpha pulps expanded greatly in Germany during the recent war years. This expansion was due undoubtedly to the lack of cotton linters and to the increased requirements for high alpha pulps for war needs. In 1944, the daily productive capacity of wood pulp with an alpha-cellulose content of 94 per cent or more was roughly 150 tons. During the past decade, there has been considerable activity in developing methods for producing purified wood pulps suitable for the manufacture of cellulose acetate and cuprammonium rayon. Cotton linters formerly were preferred for these cellulose derivatives. Of special interest was the utilization of beechwood for a large portion of the high alpha pulps as well as for ordinary rayon and nitrating pulps.

The processes used in Germany for producing pulps with alpha-cellulose contents of 94 per cent or over fall into four general classes:

1) Purification of sulphite pulps
2) Purification of sulphate pulps
3) Prehydrolysis of wood chips followed by sulphate pulping and bleaching
4) Nitric acid pulping

These various procedures are described here briefly on the basis of investigations of the author and others† in Germany during the summer of 1945.

Purification of Sulphite Pulp

Caustic soda purification of unbleached and bleached sulphite pulp was practiced in order to raise the alpha-cellulose content to 96 per cent or better and to reduce the hemicellulose content. The procedures used differed somewhat in detail and were generally identified with the firm producing the purified pulp.

Method of Temming

The firm of Peter Temming (5) in Glückstaft was a long-time producer of purified pulp for cellulose acetate using linters as the starting material. The procedures developed for cotton were applied fairly successfully to unbleached and bleached wood pulps. The raw material mostly used was German bleached spruce sulphite pulp. The unbleached and bleached pulps were purified by a simple caustic extraction in steel globe rotaries. Three per cent sodium hydroxide based on the pulp was used. The treatment occupied 6 to 8 hours at 45 pounds per square inch. The time of treatment depended on the viscosity value desired in the final purified pulp. In the case of unbleached pulps, the caustic extraction was followed by bleaching in tile-lined Hollander bleachers (5,500 pounds capacity). A conventional two-stage chlorination-hypochlorite bleaching procedure was used.

Alphalint Procedure

Unbleached beech sulphite pulp was purified and bleached when necessary at Westphälisch Zellstoff A. G., Wildshauser (2, 5), producers of "Alphalint" pulp. The unbleached beech pulp was manufactured according to conventional sulphite pulping practice at the same mill. It had a roschier number of 150 to 200, a viscosity of 350 to 400 millipoises and an alpha-cellulose content of 89 per cent. The purification was conducted in spherical rotary digesters of 1,059 cubic feet capacity. The pulp was treated with 8 per cent sodium hydroxide and 1 per cent sodium carbonate for 3 hours at 150 C. The consistency at the start of the purification was 14 per cent. The yield of purified, unbleached pulp was 75 per cent of the unpurified pulp. The pulp was then bleached in tile-lined Hollander bleachers of 7,768 cubic feet capacity. The bleaching procedure was based on two stages of sodium hypochlorite bleaching. The yield of purified, bleached pulp was 33 to 35 per cent of moisture-free wood. The pulp was reported to be used by Bemberg at Wuppertal for cuprammonium rayon and by I. G. Farbenindustrie at Dormagen for cellulose acetate. An analysis of the purified and bleached pulp is given in Table 1.

Alphalint pulp was also produced at an associated plant at Peschelmühle near Dresden. In this case the starting material was unbleached spruce sulphite pulp purchased from the Aschaffenburger or Waldhof concerns.

Procedure at I. G. Farbenindustrie

Nitric acid pulp from beech was apparently the first preference after linters for the manufacture of cellulose acetate and cuprammonium rayon at the Dormagen plant of I. G. Far-

(*) Forest Service, U. S. Department of Agriculture. Maintained at Madison, Wisconsin, in co-operation with the University of Wisconsin.

(†) Acknowledgment is made to G. K. Dickerman, technical director, Consolidated Water Power and Paper Company, Wisconsin Rapids, Wisconsin, who was a member of the Forest Products team, Technical Industrial Intelligence Committee, for part of the investigation covered by the author (5).

benindustrie (*1*). However, the supply of the nitric acid pulp was not sufficient. Therefore, bleached beech sulphite pulp was purchased from the Waldhof concern and purified at Dormagen. A cold extraction was mostly used, although hot extraction was employed occasionally. In the cold extraction the pulp was treated for 1 hour at room temperature with a 10 per cent sodium hydroxide solution. The consistency at the start was 5 per cent. The slurry was then diluted to a consistency of 1.5 per cent with additional 10 per cent caustic solution. The pulp was then washed on a vacuum filter first with water at 60 C. and then with cold water. The yield of purified pulp was 85 per cent of the bleached pulp. An analysis of the cold extracted pulp is given in Table 1.

The hot caustic extraction process involved treatment of the pulp with 2.5 per cent sodium hydroxide at 90 C. The yield in this case was 75 per cent of the unpurified pulp. An analysis of the hot extracted pulp is given in Table 1.

Purification of Sulphate Pulp

A purified pine sulphate pulp was produced at the Johannesmühle plant of the Waldhof concern (*3, 5*). The bleached sulphate pulp was treated with "white" cooking liquor at a consistency of 11 to 12 per cent for one hour at room temperature. The white liquor had a concentration equivalent to 100 grams per liter of sodium oxide with 25 to 30 per cent sulphidity. The extracted pulp was then washed on rotary vacuum filters. The yield of pulp was approximately 35 per cent based on the wood. The annual production of this pulp was 10,000 metric tons. The pulp was reported to be used in the manufacture of rayon tire cord and special paper products.

Prehydrolysis Followed by Sulphate Pulping and Bleaching

The development of hydrolysis of wood chips prior to pulping apparently had as its purpose the production of sulphate pulps suitable for the most exacting cellulose derivatives. The prehydrolysis was conducted under acid conditions. Two general methods, differing slightly in detail, were used or proposed for use. These methods are described below.

Waldhof Procedure

The Johannesmühle plant of the Waldhof concern (*3, 5, 6*) subjected pine chips to water hydrolysis before sulphate pulping and bleaching. The prehydrolysis was conducted in steel sulphate digesters. A digester was first charged with chips and water. The temperature was then raised to 130 to 150 C. and maintained for 0.5 to 2.0 hours. The pressure during prehydrolysis was 59 to 74 pounds per square inch and the total time was 2 to 3 hours. The *p*H value was 3.8 at the end of the extraction. The extraction water was then drained and the chips washed with water. The extraction removed 6 to 8 per cent of hemicellulosic material. After washing the extracted chips they were pulped by a conventional sulphate procedure and finally bleached. The bleaching followed a standard three-stage process involving chlorination, acid wash, neutral hypochlorite treatment, wash, and alkaline hypochlorite treatment. The chemical analysis of this pulp is given in Table 1. The yield of bleached pulp was 38 per cent based on the moisture-free wood. The annual production of 6,000 metric tons was divided into 3,500 tons for viscose rayon and 2,500 tons for cigarette paper and special papers. The rayon was reported to be especially suitable for heavy-duty tire cords. The pulp had been found promising for cellulose acetate but this application had not been commercial.

If the prehydrolysis were conducted with a small amount of mineral acid in the water, 12 to 13 per cent of hemicellulosic material was extracted. The final *p*H value in this case was 2.8. The alpha-cellulose content of the pulp was 95 per cent. However, this acid prehydrolysis required an acid-resistant digestor and was not used commercially.

Poplar (aspen) wood was reported to lend itself excellently to prehydrolysis followed by sulphate pulping and bleaching.

The liquor extract was fairly rich in sugars which could be used to grow yeast. The sugars amounted to 1.5 per cent of the extract when water alone was used and 3 per cent when the prehydrolysis was started under slightly acid conditions.

Phrix Procedure

Another prehydrolysis process was that proposed by Phrix, A. G., Hamburg. The Phrix process (*5*) was based on more or less satisfactory operation with straw. Two sulphate mills (at Kustrin and Hirschberg) were practically ready to start production shortly before the end of the war. In the Phrix process, pine chips are subjected to an acid prehydrolysis before conventional sulphate pulping and bleaching. The hydrolysis stage was conducted in a stone-lined digester of 4,400 cubic feet capacity. The hydrolyzing agent was 0.3 per cent sulphuric acid and the liquor-wood ratio was 4.5 to 1. The hydrolysis took place at 125 C. and 59 pounds per square inch and required 2 to 3 hours. Approximately 19 per cent of the wood was extracted in this way. Reducing substances were reported to amount to 95 per cent of the extracted material. This material was proposed as source of sugars for yeast growth. Following the prehydrolysis, the chips were washed, pulped by the sulphate process, and bleached. The bleached pulp was produced in a yield of 32 per cent based on the wood. An analysis of the pulp is given in Table 1.

Table 1—Typical analyses reported for German high alpha pulps

	Alpha-cellulose (Per cent)	Hemi-celluloses (Per cent)	Ash (Per cent)	Viscosity (Millipoises)
Purified sulphite pulps				
Temming (spruce)	96-97	0.5	0.15	340
Alphalint (beech)	95-96	1.1-1.5	0.1-0.2	270-300
I. G. Farbenindustrie (beech)				
Cold caustic extraction	96	1.8	.25	...
Hot caustic extraction	94.5	1.8	.2	...
Purified sulphate pulp				
Waldhof (pine)	97	...	...	...
Prehydrolyzed sulphate pulp				
Waldhof (pine)	93.5-94	...	...	...
Phrix (pine)	92-94	...	...	...
Nitric acid pulp				
I. G. Farbenindustrie (beech)	97-98	1.5	.1	400

Nitric Acid Pulping

Nitric acid was made in one plant, the I. G. Farbenindustrie mill at Wolfen (*1, 4, 7*). This mill had a daily capacity of 40 metric tons on a basis of 88 per cent alpha-cellulose and 12 per cent moisture.

The pulping was conducted in three stainless steel digesters of 6,356 cubic feet capacity each. The working space was 5,296 cubic feet per digester, the difference being allowed for foaming. The digesters were equipped for external circulation through coolers employing a brine coolant.

The pulping procedure was as follows: A digester with its charge of beech chips was first evacuated to approximately 28 inches of water. Nitric acid of 12 to 15 per cent concentration was then charged in the ratio of 3.5 parts of acid to 1 part of dry wood for the impregnation period. The impregnation included 1 hour at 40 C., 1 hour at 40 to 45 C., and 1 hour at 45 C. The pressure was 45 pounds per square inch. The liquor was circulated and cooled during this period. The liquor, now at 9 to 12 per cent concentration, was next drawn off. Hot water at 70 to 80 C. was then added, bringing the nitric acid concentration to 4 per cent for the pulping stage. This stage occupied 7 hours. The temperature increased from 70 to 95 C. during the pulping period. The pressure was approximately 15 pounds per square inch. The nitric acid concentration dropped to 0.9 to 1.0 per cent during ths period. The spent pulping liquor was then withdrawn and replaced with a 1 per cent caustic soda solution obtained from the next operation. The treatment with 1 per cent sodium hydroxide took place for 0.5 hour at 65 to 70 C. The spent liquor from this stage was then withdrawn and replaced with a fresh 4 per cent caustic soda solution. This stronger caustic treatment required 2 hours at 80 C. at atmospheric pressure. The spent liquor from this treatment was then withdrawn for use as described. The pulp was finally washed with water at 60 C. for 0.5 hour and dumped into vats below the digesters. The whole process occupied approximately 21 hours.

The spent and waste liquors were handled as follows: The nitric acid at 9 to 12 per cent concentration from the impregnation stage was fortified for further use. The spent liquors from the pulping stage at 1 per cent nitric acid concentration and from the weak alkali treatment were evaporated to 40 per cent solids and burned at a low temperature to produce a mixture of active carbon and sodium carbonate for use in the metallurgical industry.

The bleaching and purification of the nitric acid pulp was done as follows: The unbleached pulp was first washed at 1 per cent consistency on a vacuum filter and then passed successively through a knotter, a disintegrator, and a riffler. The pulp was then washed with hot water and thickened to 4 to 5 per cent consistency. The pulp was next chlorinated in a tower at 25 to 30 C. using 2.5 to 3.0 per cent chlorine. The chlorination took 1.5 hours. The chlorinated pulp was first washed and next treated with caustic soda solution of 1 to 2 per cent concentration. The caustic-treated pulp was washed and thickened to 35 per cent consistency, using a high-pressure press. The pulp was next treated with caustic soda of 12 per cent concentration at 25 C. for 2 hours. The pulp was then washed in a four-stage process on a vacuum filter in a way to avoid excessive dilution of the alkali. Part of the caustic soda recovered here was used for the alkali treatment following chlorination. The refined pulp was finally bleached with hypochlorite in a Hollander bleacher using 0.4 per cent sodium hydroxide and 0.2 to 0.3 per cent chlorine based on the pulp. This treatment took place at a *p*H value of 9, a consistency of 5 to 6 per cent, and a temperature of 40 C. for 2 hours. The pulp was washed and then treated first with hydrochloric acid and next with sulphur dioxide water before being given the final wash.

The pulp was produced in the form of flakes at 55 to 60 per cent moisture content or as a creped sheet with a moisture content of 6 per cent. A sample analysis of the pulp is given in Table 1.

The yield of bleached and purified pulp was 35 per cent on the basis of the wood. The chief chemical requirements for producing a metric ton of pulp were reported to be: beech wood, 6 raum meters; nitric acid, 1,055 pounds; caustic soda, 1,320 pounds; chlorine 748 pounds.

Relative Prices and Quality of Purified Wood Pulps

Relative price values per 100 pounds of the various high alpha pulps were as follows:

	Marks
Unpurified, bleached beech sulphite pulp	14.5 to 16
Purified, bleached beech sulphite pulp (Alphalint)	33.5
Purified, bleached spruce sulphite (96 per cent alpha)	31
Prehydrolyzed sulphate pulp	19.5 to 22
Nitric acid pulp	27 to 32

Unpurified, bleached beech sulphite pulp alone or in mixture with a similar spruce pulp both with alpha-cellulose contents of 88 to 90 per cent, were apparently accepted as satisfactory for viscose staple fiber. For nitrating purposes it was found necessary to use 30 per cent spruce with 70 per cent of the unpurified, bleached beech sulphite pulp. However, higher alpha wood pulps with alpha-cellulose contents of 96 per cent or over were generally necessary for tire cord rayon, cellulose acetate, and cuprammonium rayon. These derivatives had been formerly made from cotton linters. The general opinion seemed to be in favor of linters and linters would be largely used again if available. The nitric acid pulp was considered to be very near linters in quality. The nitric acid pulp was considered to be the only satisfactory wood pulp for cellulose acetate films. Wood pulp with an alpha content over 96 per cent had been used successfully for acetate yarn. It was claimed that the chemical nature of the constituents other than alpha-cellulose in the prehydrolyzed sulphate pulp permitted a lower alpha-cellulose content. Tire cord rayon of satisfactory quality had been made from prehydrolyzed pulp with an alpha-cellulose content of 92 to 94 per cent.

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New Slide-Film Series for Safety Instruction

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LYNE S. METCALFE

▶▶▶ FOR SOME TIME, the paper industry has recognized the need for more visual aids in safety education. This need has been especially desirable along the line of basic safety practices which are accepted today by all American industry as the core of any mill or plant safety program.

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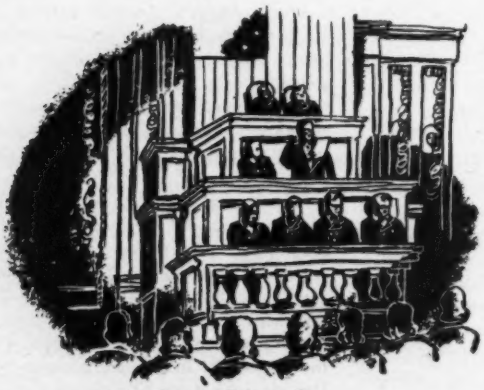

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Detroit Meeting of TAPPI

Above—A large number attended the dinner meeting at the Statler Hotel on the evening of the first day of convention

Below—Officers and distinguished guests were seated at the speakers table

▶▶▶ THE FIRST OF THREE fall meetings scheduled by the Technical Association of the Pulp and Paper Industry this year was held September 26-28 at Detroit, Michigan; the places of meeting, Hotel Statler and the Horace A. Rackham Educational Memorial Building.

This meeting was looked upon as the 1946 fall meeting of the Association, it having been the custom of TAPPI in former years to hold only one national meeting each fall in addition to the regular annual February or spring meeting. This one, however, was much different in character from previous fall meetings. The entire program did not cover a wide scope of technical activity—rather it was confined to one subject, "The Present Status of Wood as a Raw Material for the Pulp and Paper Industry."

The general theme was approached from three angles: (1) pulpwood economics, (2) pulpwood procurement, and (3) pulping technology. The program was conceived and effected by Dr. Harry F. Lewis of the Institute of Paper Chemistry. It was definitely a technical forestry program slanted primarily toward technical men concerned with problems incident to the converting of wood into pulp for use in papermaking.

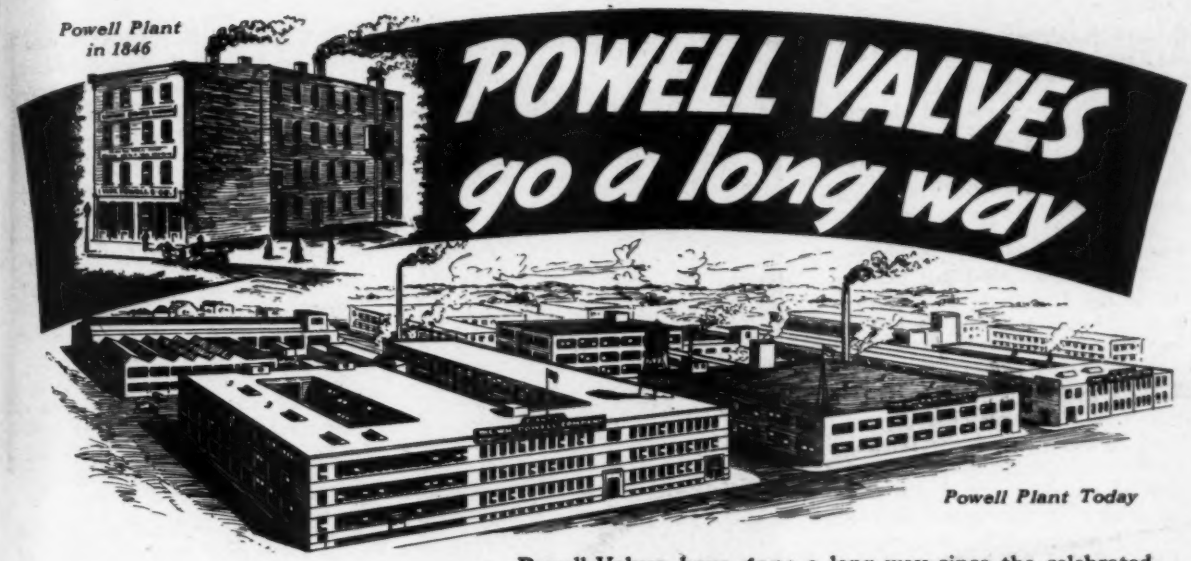
The first session of the meeting was called to order by G. W. E. Nicholson, vice president of the Union Bag and Paper Corporation and president of TAPPI, about 10:45 A. M. in the Grand Ball Room of the Statler Hotel. Mr. Nicholson in his opening remarks called attention to the other two scheduled fall meetings of TAPPI: the Milwaukee meeting with headquarters at Hotel Pfister, and the New Orleans meeting with headquarters at the Roosevelt Hotel. The dates of the Milwaukee meeting were given as October 2-4; of the New Orleans meeting, October 14-16.

Mr. Nicholson related that with the Detroit meeting, TAPPI was inaugurating a plan for holding several regional meetings in the fall and which most likely will be the plan used for future fall meetings. He suggested the possibility of sulphite pulping offering a fertile field for one of these meetings in the future. The Milwaukee meeting is to take on the aspects of a general engineering conference, while the New Orleans meeting will stress alkaline pulping and chemical products.

After a very brief business session, Mr. Nicholson called upon Dr. Lewis to take charge of the session.

Dr. Lewis told of a visit to the West coast which he made some months ago; and, as a result of what he saw there, he suggested the need for such a program as already outlined to R.

At the dinner meeting, seated near the microphone were: Ralph Hayward, Kalamazoo Vegetable Parchment Company (a past president of TAPPI); R. B. Robertson, Sr., Champion Paper & Fibre Company (guest speaker); G. W. E. Nicholson, Union Bag & Paper Corporation (president of TAPPI); and Dr. Harry Lewis, Institute of Paper Chemistry



Powell Valves *have gone* a long way since the celebrated Powell "Star" Regrinding Globe Valve was patented in 1865.

Today, with a notably complete line of valves, which includes every required type, size and design—in bronze, iron, steel and many corrosion-resistant metals and special alloys—Powell Valves *are going* a long way in meeting the flow control requirements of modern industry.

Above all, Powell Valves *go* a long way in actual service, because each valve is designed to give maximum performance under the actual operating conditions it will encounter.

Catalogs on request. Kindly state whether you are chiefly interested in Bronze, Iron, Cast Steel, or Corrosion-Resistant Valves.

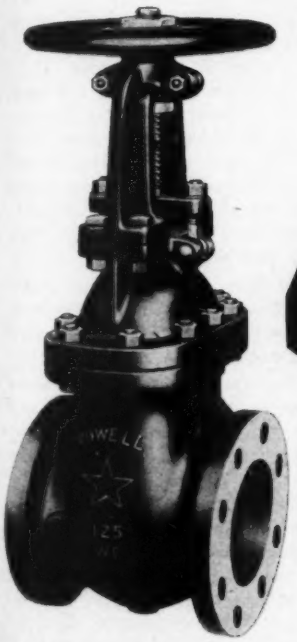


Fig. 1893—Flanged End O. S. & Y. Gate Valve for 125 pounds W.S.P. Has low nickel-iron body and yoke, with stainless steel seats, disc and stem. If desired, disc made of Ni-resist can be supplied.

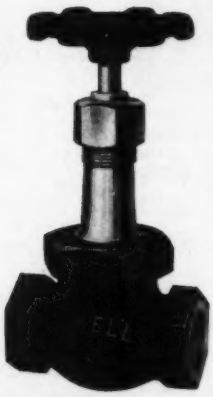


Fig. 190—150-pound Iron Body Bronze Mounted "Irenew" Globe Valve. Has screwed ends, union-bonnet, regrindable, renewable, wear-resisting "Powellium" seat and disc. Also available in All Iron for process lines.

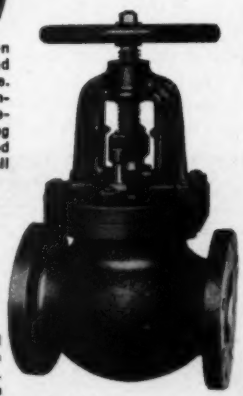


Fig. 241 — 125-pound Iron Body Bronze Mounted Globe Valve. Flanged ends, outside screw rising stem, bolted flanged yoke and regrindable, renewable bronze seat and disc. Also available in All Iron.

Fig. 375 — 200-pound Bronze Gate Valve with screwed ends, inside screw rising stem, union-bonnet, renewable, wear-resisting "Powellium" nickel-bronze disc.

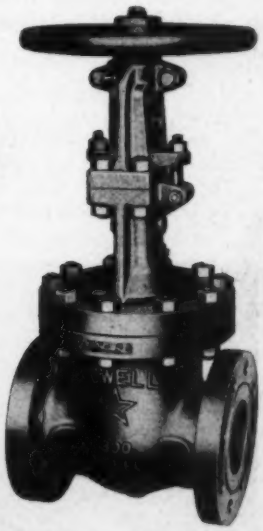


Fig. 3003—Class 300-pound Cast Steel Gate Valve with bolted flanged yoke, outside screw rising stem and taper wedge solid disc. Powell Cast Steel Valves of all types are available in pressure classes from 150 to 2500 pounds, inclusive.

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DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

G. Macdonald, secretary-treasurer of the Association.

Dr. Ruth Shallcross, Institute of Paper Chemistry, presented the only paper to be read at this first session of the meeting. Her subject was "Some Economic Aspects of the Pulpwood Situation."

With the exception of the dinner meeting of the first day, which also was held in the Grand Ball Room at the Statler Hotel, the other sessions were held in the main auditorium of the Horace A. Rackham Educational Memorial Building.

These sessions included the afternoon meeting of the first day with Dean S. T. Dana of the School of Forestry and Conservation, University of Michigan, as chairman; the morning session of the second day with K. S. Trowbridge, logging engineer, American Pulpwood Association, as chairman; and the afternoon session of the second day with Milton O. Schur, technical director, Ecusta Paper Corporation, as chairman.

The theme of the session presided over by Dean Dana was "A Survey of Available Wood Stands in the United States." In carrying out this theme, five papers were presented.

The first paper covered the subject from the standpoint of New England and eastern United States. It was read by V. L. Harper, director, Northeastern Forest Experiment Station.

H. J. Andrews, regional forester, Region 6, presented the second paper. The scope of his presentation was the Pacific Coast.

The Lake States were covered by E. L. Demmon, director, Lake States Forest Experiment Station, in the third paper; while James W. Cruikshank, chief, division of Forest Economics, Southeastern Forest Experiment Station, covered the South in the fourth paper.

At the opening session, Dr. Harry Lewis, of the Institute of Paper Chemistry (right), introduces Dean S. T. Dana, School of Forestry and Conservation, University of Michigan

The concluding paper of this session in the form of a "Summary and Analysis of the Survey from the National Viewpoint," was read by H. R. Josephson, assistant chief, Division of Forest Economics, U. S. Forest Service.

Three papers were presented before the session presided over by Mr. Trowbridge. The theme of these papers was "New Developments Relating to Improved Pulpwood Procurement."

The first of these papers was presented by J. W. McNutt, of the Kimberly-Clark Corporation. It was devoted primarily to the Lake States and that region of Canada immediately adjacent thereto.

Axel Brandstrom, formerly chief forester of Crown Zellerbach Corporation, discussed the Pacific Coast in the second paper of the session; while the South was covered by C. E. Knapp, logging engineer, Southern Pulpwood Conservation Association, in the third paper.

"Pulping Characteristics of the Available Species" was the theme of the session presided over by Milton O. Schur. At this meeting, the Lake States and northeastern woods were discussed by J. N. McGovern in a joint paper by E. R. Schafer, J. S. Martin and himself, each of the staff of the U. S. Forest Products Laboratory. Pacific Coast woods were covered by Walter Holzer of the Crown Zellerbach Corporation in a joint paper by R. S. Hatch, director of research, Weyerhaeuser Timber Company, Pulp Division, and himself.

Donald Niemeyer in a joint paper by L. V. Forman and himself, both of the Institute of Paper Chemistry, covered Southern Woods.

A summary of the over-all wood situation in the United States and Canada with consideration to various chemical by-products concluded the session. This summary was given by Dr. Harry F. Lewis of the Institute of Paper Chemistry.

Although this session concluded the formal meetings of the program, the morning of September 28 was set aside for round table meetings of all committees of TAPPI to discuss projects and to finalize plans for the sessions of the annual meeting to be held in February, 1947.

The guest speaker at the dinner meeting, previously cited, was Reuben B. Robertson, Sr., president, Champion Paper & Fibre Company, and also president of the American Paper and Pulp Association. His subject was "Thrift vs. Drift in Forest Practice."

Briefing his remarks, the following statements are quoted directly from them:

"Until quite recently most pulp mills, surrounded by an abundance of suitable timber were inclined to get their pulpwood supplies in the simplest way possible, in the way that meant fewest headaches for manage-

Panel of forestry experts at opening session of the TAPPI meeting. Left to right—H. J. Andrews, Regional Forester (Region 6); V. L. Harper, Northeastern Forest Experiment Station; E. L. Demmon, Lake States Forest Experiment Station; H. R. Josephson, Division of Forest Economics, U. S. Forest Service; James W. Cruikshank, Southeastern Forest Experiment Station; and Dr. Harry Lewis, Institute of Paper Chemistry, who was program chairman of the Convention

Wyandotte invests

Twenty-five million dollars. . . . in an expansion program designed to help meet ever-increasing demands for industrial chemicals.

It is an investment founded upon faith—faith in the American system of free enterprise and in the continued greatness of this nation.

This program, already begun, is scheduled to be completed within eighteen months. It will greatly increase Wyandotte's capacity to produce calcium carbonate, chlorine and soda ash. Improvements in the method of processing caustic soda will also increase production of this vital material.

Included in the plans are new plants for the manufacture of glycol and synthetic detergents. The erection of the glycol and synthetic detergent plants will mark a major move by Wyandotte into the field of organic chemicals.

In addition to the huge construction project, Wyandotte is enlarging its sales force, its research, technical and engineering staffs—the better to meet customer needs.

Wyandotte will continue—as it has throughout the period of shortages—to allocate its production fairly to its regular customers at all times. Meanwhile, Wyandotte looks forward to the day when all requirements can be met promptly and entirely.

Wyandotte REG. U. S. PAT. OFF. *OFFICES IN PRINCIPAL CITIES*

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Soda Ash • Caustic Soda • Bicarbonate of Soda • Calcium Carbonate • Calcium Chloride • Chlorine
Hydrogen • Sodium Zincates • Aromatic Intermediates • Dry Ice • Other Organic and Inorganic Chemicals

ment. In general, that meant tnat supplies were obtained by open market purchase of wood delivered by a contractor on cars, with only residual needs taken care of through operations on company owned lands. The purchasing company was not required to, and did not, give much attention to extent of utilization of potential forest resources that prevailed.

"Today with steadily diminishing stands of timber and steadily increasing price competition from other needed forest products, users are properly becoming increasingly cost and method conscious.

"Pulp mill operators are beginning to appreciate in greater degree the sometimes forgotten fact that they have important enemies in the competition for timber, in the *nonusers* as well as the *users*. Forest fire and decay are in this sense competing nonusers. No good comes from their ravages of the forest.

"The growing forest like a litter of pigs has its 'runts' of low vitality as well as its individuals of high vitality. They seldom reach equal strength because the stronger pushes the weaker aside at feeding time and the latter fails to get even his proportionate part of the food supply, and unless artificial aids are provided, the runts wither and die.

"Occasionally it has been found practical to conduct thinning operations before decay of the 'runts' has taken its toll, but such instances form the exception rather than the rule. Pulp mill operators generally, have in the past made little use of this potential resource, because of practical considerations of costs and methods.

"Obviously, it will cost more in labor to cut, log, load, and transport from the woods a multitude of small sticks than it will to apply these same processes to half the number of larger pieces, at least as long as conventional methods are used. Furthermore, the penalties for handling a multitude of small sticks are not confined to the operations in the woods, but extend throughout the processes of unloading, storing, barking and chipping at the wood room of the pulp mill. It is evident that for adequate utilization of this small timber, new methods and new techniques will be required all the way down the line.

"Stumpage that is noncompetitive with any established demand, should be considered as a potential raw material supply even though the cost of getting it out is higher than that to which the operator is normally accustomed. Low stumpage value can at least in some degree neutralize higher labor cost.

"To handle sticks as small as two inches in diameter, tree length, or log length transportation; mechanical loading, and special truck and railroad car bodies, all warrant careful study.

"At present, excessive losses occur in removing the bark in the barking drums due to wide spacing of the channels in the drums as usually installed.

"Experiments with narrow spacing of channels are being made with rather promising results. However, with improved methods of freeing the liquid pulp from fragments of bark and similar impurities through better screening, better riffling, better bleaching, etc., many more liberties can be taken with the initial wood preparation than was formerly the case. Experimental runs also indicate that substantial percentages of thin barked small diameter pulpwood can be satisfactorily used without any bark removal whatever.

"I believe the pulp manufacturer of the future is going to have to content himself with increasing percentages of the 'crumbs' from the forest table instead of the full loaf and furthermore that he will learn to like it.

"Overemphasis on low costs and on rapidity of growth have resulted in bringing into the South more pulpwood consumers than it is now ready to support on a sustained yield basis.

"Protection against over development of wood using industries in given areas, is something greatly needed not only for those already established, but also for those who plan to build. As so often happens, it is far easier to prove the need than to provide the remedy.

"The South eventually can produce through forest management much more pulpwood than it now produces, but its forests need a rest from over exploitation. Fire protection, forest management, fuller utilization, fine as they are, cannot make their beneficial influences retroactive.

"Success in all work in the business and professional field is always a source of personal satisfaction. Today the success of every constructive enterprise is not only a satisfaction but it is a social duty. Success should be not an end in itself, but a means to an end.

"It is only by successful operation that an industry can carry the increasingly heavy burdens of social security, of higher standards of living which we all so earnestly desire. More and more the technically trained man must be relied on to carry the ball. TAPPI and its members will have an ever broadening field of usefulness before them. They should help us to avoid the drift of outmoded habit and develop the thrift of betterment and of invention."

A pleasant sidelight of the dinner meeting, in addition to the well received address of Mr. Robertson, was an extemporaneous talk by G. W. E. Nicholson. In this talk, Mr. Nicholson highlighted some of his recent experiences and observations as a member of a party, made up largely of research workers, that visited Sweden, Norway, and Denmark.

Registration at the meeting totaled about 250.

◆

PAC. PAPER MFRS. ASS'N URGED TO PROVIDE JOBS FOR DISABLED VETERANS

Speaking before a meeting of the Disabled American Veterans national convention in Portland, Oregon, September 4, Colonel A. R. Heron, vice president of the Pacific Coast Association of Pulp and Paper Manufacturers, urged fellow industrialists to provide job opportunities for disabled veterans.

Colonel Heron stated that 100 per cent physical capabilities are not necessary for a man to successfully perform the average job. Further, he reminded the industrialist that neither management nor the nation is doing a favor, but that all citizens are aiding the nation as a whole when job opportunities are provided for handicapped men.

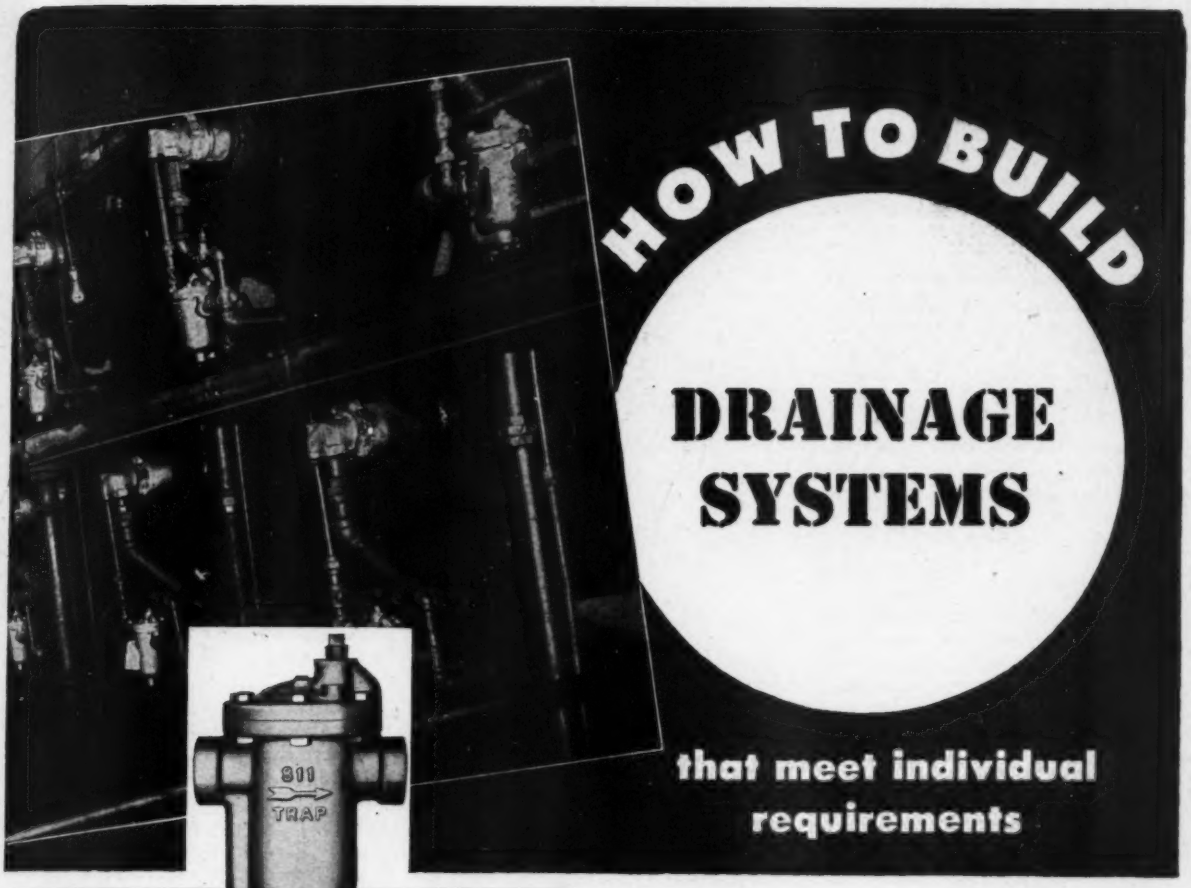
◆

FIRST MATERIALS HANDLING EXPOS. TO BE IN CLEVELAND

The first exposition to deal entirely with industry's materials handling problem, a phase of industry which represents approximately twenty-five per cent of all costs, will be held at the Public Auditorium, Cleveland, Ohio, January 14 through 17, 1947.

Earl I. Burke, manager of shipping for Republic Steel Company and chairman of the packaging and loading committee of the American Iron and Steel Institute, who is chairman of the policy committee of the first National Materials Handling Exposition, has stated that the Cleveland showing will furnish the first opportunity for production, distribution, and warehousing executives to see under one roof all methods of speeding materials along production lines.

Chairman of the exposition committee is Edwin J. Heimer, president of Barrett-Cravens, Chicago. Ezra W. Clark, vice president and general manager of the Clark Tructractor Division of the Clark Equipment Company, Battle Creek, Michigan, is chairman of the exposition program committee.



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- **SPECIAL DESIGN.** Armstrong has designed a trap to meet the special requirements of draining individual paper machine dryers.
- **BIG AIR HANDLING CAPACITY.** Vents air from cold dryers; continues to purge air from hot dryers.
- **FACILITATES PRESSURE CONTROL.** Provides a definite stopping point for live steam; permits accurate control of steam pressure (and temperature) in each dryer.
- **TROUBLE-FREE PERFORMANCE.** Very simple construction. All stainless steel mechanism of same design and construction used in forged steel traps for 1500 p.s.i. and 900°F.
- **LONG LIFE—LOW MAINTENANCE.** Where ordinary traps wear out rapidly on paper machine service, the specially designed Armstrong trap has demonstrated ability to stay on the job with no more maintenance than for ordinary service.

Whether it's an old machine still on the job or brand new dryers designed for record-breaking production, you can get a modern, high efficiency drainage system for it by calling or writing Armstrong. Armstrong has the equipment and experience to give you a simple, economical solution for your particular problems. The Armstrong organization stands back of every installation to guarantee your complete satisfaction. Highly successful jobs are in service today. Write for information.

ARMSTRONG MACHINE WORKS
816 Hoffman St., Three Rivers, Michigan

Inverted Bucket Steam Traps for Every Paper Mill Requirement

Dryer Drainage System Trapping and Engineering

TAPPI Holds First Engineering Conference

▶▶▶ THE FIRST EFFORT of the Technical Association of the Pulp and Paper Industry to hold a meeting devoted entirely to the engineering aspects of the industry was an outstanding success.

The meeting, held on October 2, 3, 4, 1946, in Hotel Pfister, Milwaukee, Wisconsin, was the first to be sponsored by the engineering division of TAPPI as presently formed. This setup includes the following committees with the respective chairman for each:

Mill Design and Economic Aspects—Milton Jacobs, Chas. T. Main, Inc., Boston, Mass.

Materials Handling—George R. Wadleigh, Consulting Engineer, Hastings-on-Hudson, N. Y.

Steam and Power—John E. A. Warner, Robert Gair Co., New York, N. Y.

Mill Maintenance and Materials—Paul D. Corning, West Virginia Pulp and Paper Co., Mechanicville, N. Y.

Drying and Ventilating—A. E. Montgomery, J. O. Ross Engineering Co., Chicago, Ill.

Mill Instrument Control—R. W. Porter, *Chemical Engineering*, New York, N. Y.

Chemical Engineering — Ray P. Whitney, University of Maine, Orono, Maine.

Engineering Research—W. G. MacNaughton, News Print Service Bureau, New York, N. Y.

These several committees are headed by Edwin F. Burns, International Paper Co., New York, N. Y., as general chairman.

Both registration, which totaled about 300 persons, and actual attendance at the various sessions were splendid.

Following registration on the morning of October 2, the meeting opened in general session with Edwin F. Burns as chairman. With the exception of some remarks by G. W. E. Nicholson, vice president, Union Bag and Paper Corporation, and president of TAPPI, the entire session was given over to comments by seven of the committee chairmen. Only R. P. Whitney and W. B. MacNaughton were absent. (It was reported that Mr. MacNaughton had been ill for several weeks.)

Each of the seven committee chairmen participating in the session reviewed the work of his respective committee to date, mentioned plans for the future, requested suggestions for papers to be presented and problems to be attacked, and appealed for names of men willing to do committee work. Mr. Montgomery in reporting on the activities of the Drying and Ventilating Committee mentioned that E. L. Sawyer had been employed as a full-time engineer for a limited period to make a study of various phases of the paper drying and machine ventilating problem in mills making bond, kraft, book, glassine, tissue, and writing.

With the exception of the talks and addresses before the dinner meeting on the evening of October 2, and the luncheon meeting on October 4, fifteen papers of definitely engineering interest were read before the meeting. Five papers were given before the Mill Maintenance and Materials Session, held during the afternoon of October 2; five papers before the Steam and Power Session, held during the morning of October 3; and five papers before the Mill Design and Economic Aspects Session on the morning of October 4.

The papers presented before the Mill Maintenance and Materials Session, presided over by Paul Corning as chairman, were: Paper Machine Maintenance, by E. D. Beachler, Beloit Iron Works, Beloit, Wis.; The Organization and Functioning of the Maintenance Department, by George H. Pringle, Mead Corporation, Chillicothe, Ohio; Kraft Mill Maintenance, by William McIntosh, Union Bag and Paper Corporation, Savannah, Georgia; Pump Maintenance, by F. R. Forrest and H. Kingsbury, Allis-Chalmers Mfg. Company, Milwaukee, Wis.; and Corrosion Prevention by K. Chamberlain, Gates Engineering Co., Wilmington, Del.

J. E. A. Warner was chairman of the Steam and Power Session. The papers of this session were: The Supertherm System of Steam Generation, by Steven Senka, Personal Products Co., Milltown, N. J.; Experiences with a Spreader Stoker Installation, by Arnold Urban, Marathon Corporation, Rothschild, Wis.; Relative Merits of 200, 400, 600, and 1200 lb. Steam for Power and Process Steam Derivation, by F. E. Laramore, Laramore & Dougles, Chicago, Ill.; Turbine Installation and Maintenance, by Hans Dahlstrand, Allis-Chalmers Mfg. Company, Milwaukee, Wis.; and Is Btu Accounting in the Steam Plant Worth While?, by J. E. A. Warner, Robert Gair Company, New York, N. Y.

Milton Jacobs was chairman of the Mill Design and Economic Aspects Session before which the following papers were presented: High Voltage Power Distribution in Paper Mills, by W. C. Bloomquist, General Electric Co., Schenectady, N. Y.; Comparison of Cost of Utilities, Paper Mill Piping, by O. P. Carter, Lumsden & Van Stone Division, Midwest Piping & Supply Co., Boston, Mass.; Trends in Mill Design and Economic Aspects, by John Statler, Consulting Engineer, Montreal, Que.; Economics of Mill Instrumentation, by R. W. Porter, *Chemical Engineering*, New York, N. Y.; and Chain Conveyors and Their Proper Application in Pulp and Paper Mills, by W. M. Huffnagel, Link-Belt Company, Chicago.

G. W. E. Nicholson was toastmaster at the dinner meeting held on the evening of the first day of the convention. At this meeting, W. Irving Osborne, Jr., President, Cornell Wood Products Co., Hummel & Downing Co., and the National Paperboard Association made a few interesting and timely remarks about Milwaukee, TAPPI, and the industry. The feature of the meeting was an address by John Wilson, physicist, Allis-Chalmers Mfg. Company, Milwaukee, Wis., on Industrial Application of Radioactive Materials. The meeting was concluded with some remarks by Mr. Nicholson covering his recent visit to Sweden, Denmark, and Norway.

The entire afternoon and evening of October 3, the second day of the meeting, were given over to a visit to the plant of Beloit Iron Works, Beloit, Wis., and to a dinner at The Wagon Wheel, Rockton, Ill.

Beloit Iron Works, as host for the entire afternoon and evening, chartered a special Chicago, Milwaukee & St. Paul train to deliver all guests to Beloit and to return them to Milwaukee after the dinner. It also chartered buses to transport the guests from the plant to The Wagon Wheel and from there back to the train for the return trip.

The sociability of the train ride coupled with the highly informative tour through the plant under the supervision of a number of well-qualified guides, and the conviviality that goes along with a splendid dinner will chronicle this afternoon and evening program as one of the highlight events in the history of TAPPI meetings.

Two facts of general interest that came from the plant visit are that some paper machines have over 100,000 parts, and that the first Yan-

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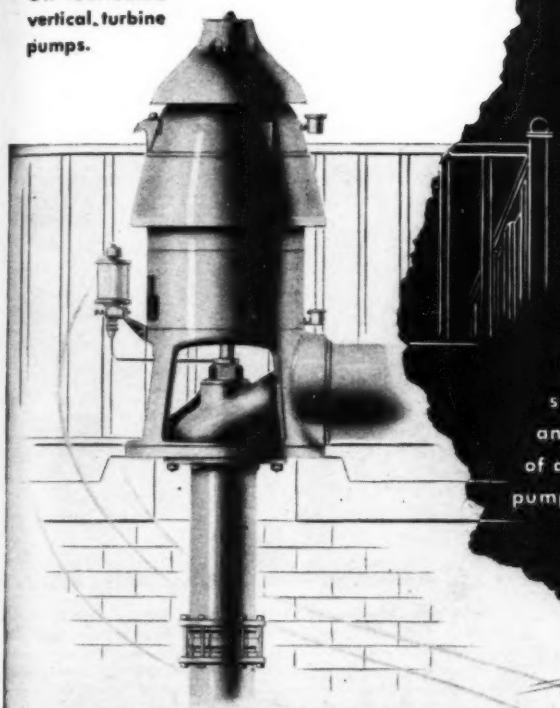
FAIRBANKS-MORSE: Oil-lubricated vertical turbine pumps.



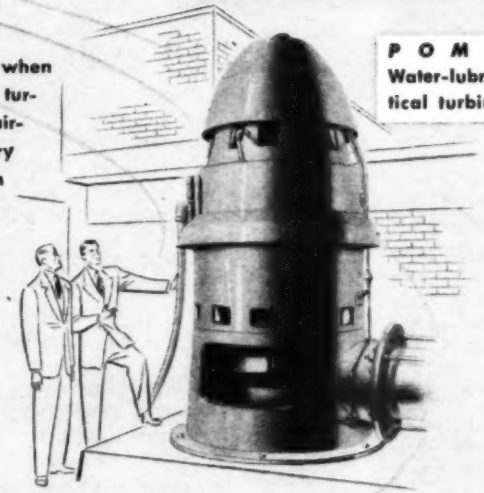
How can you tell a good Pump?

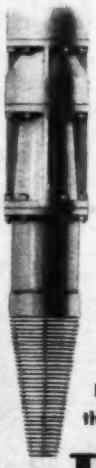
After all, what is the best way to tell a good pump? While you can compare efficiency curves, high efficiency in the test-room is no assurance of stamina on the job. Nor can performance data prove that you're getting the pump that's best for your specific liquid-moving work. *The name alone tells this story!*

Who makes it? On a good pump the name plate symbolizes manufacturing facilities, years of research and testing, trained men and intimate knowledge of all pumping requirements that back an ability to pump for you for less, through the years.

THERE'S NO GUESSWORK required when it comes to choosing the best vertical turbine pump for you. For the names of Fairbanks-Morse and Pomona identify every type and size of vertical turbine found in industry today; and these names stand unique in the pump-building world as two of the oldest, most widely respected and "depended upon" pump builders.

POMONA: Water-lubricated vertical turbine pumps.





GOOD PUMPS? Yes, and there are many who know these as *the best* of the vertical turbines—thousands and thousands of users who consistently report "maintenance costs nil, power costs extremely low."

REMEMBER THESE NAMES and all that is behind them when faced with a pumping problem. Then see your Pomona dealer or visit your Fairbanks-Morse branch office—the "big store" for all *good* pumps.

FAIRBANKS-MORSE

A name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • MAGNETOS • GENERATORS • MOTORS • PUMPS
SCALES • STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT

kee machine to be constructed in the United States was made in 1891 by Beloit Iron Works for Thilmany Pulp and Paper Company, Kaukauna, Wis. These facts along with much other equally interesting data were presented in a pocket-size brochure entitled "TAPPI day at Beloit, October 3, 1946." A copy of this brochure was given to each visitor at the plant.

As an informal finale to the meeting, following the luncheon on the last day, the rest of the afternoon was given over to plant visitations. In this case, the visitors took advantage of the kind invitations of both the Allis-Chalmers Mfg. Company and the A. O. Smith Corporation to visit their plants in West Allis and Milwaukee, respectively. Some of the visitors selected one plant to visit; some, the other. In either case, they were brought in touch with many new marvels of modern industry.

The guest speaker at the luncheon of the last day of the meeting was C. E. (Dan) Patch of the Morton C. Tuttle Company, Boston, Mass. In his inimitable way he brought home to his listeners the need for watching for and controlling industrial wastes. His subject was Watch Your Waist Line. Cleverly in the course of his remarks, this theme was changed over to Watch Your Waste Line. Upon so doing, he used his broad experience to cite numerous problems involving waste that he had studied over a period of years.

Real praise was given to R. K. Prince of the Allis-Chalmers Mfg. Company, Harry C. Moore of the Beloit Iron Works, and H. A. Schmitz, of the A. O. Smith Corporation, who together functioned as a local committee, for the splendid job that was done in handling so many of the details incident to the planning and actual conduct of the highly successful meeting.

◆

NORTHWESTERN DIVISION SUPERINTENDENTS MEET

Two days of conferences combining election of officers, consideration of addresses on industry equipment, visits to nearby mills, and entertainment comprised the full schedule of the meeting held at the Conway Hotel, Appleton, Wisconsin, by the Northwestern Division, American Pulp and Paper Mill Superintendents Association, September 20.

R. A. Nugent, of the Port Edwards Paper Company, Port Edwards, Wisconsin, was elected chairman of the division, and he presided over this fall meeting. Mr. Nugent succeeds L. J. Smith, of the Combined Locks Paper Company, Kaukauna, as chairman.

Paper Ass'n Officers—Here are the new and old officers of the Northwestern division of the American Pulp and Paper Mill Superintendents Association. Left to right are L. J. Smith, Kaukauna, Combined Locks Paper company, retiring chairman; F. X. Kreiling, Appleton, Thilmany Pulp and Paper company, retiring secretary-treasurer; L. S. Sabatke, Wausau, Marathon Corporation Rothschild division, new secretary-treasurer; S. E. Ekman, Rhinelander Paper company, first vice chairman; and R. A. Nugent, Nekoosa-Edwards Paper company, Port Edwards, Wis., new chairman

Other officers elected were: S. E. Eckman, Rhinelander Paper Company, Rhinelander, Wisconsin, vice chairman (he served formerly as second vice chairman of the association); L. S. Sabatke, Marathon Corporation, Rothschild Division, secretary-treasurer (he succeeds F. X. Kreiling, of the Thilmany Pulp and Paper Company, Kaukauna).

Highlights of the conference were addresses concerning industrial equipment by outstanding men from the association and the affiliates. Grover Keeth, of the Marathon Corporation, dscribed "The Astrom Chain Barker," a Swedish development which is in use at the Rothschild plant where it was installed about a month ago. D. G. Sutherland, of the Sutherland Refiner Corporation, showed slides which described pictorially the operation of his company's refiner. He also spoke on the construction, application, and flexibility of the single rotary disc type refiner. C. H. Vickery, of the E. D. Jones and Sons Company, covered the subject of the use of the beater in the industry, outlining graphically the steady improvement in function of the beater.

Delegates to the conference were entertained at a stag dinner at the Conway Hotel, golf, and visits to the Fox River Valley mills.

SOUTHERN PAPER ASS'NS HOLD JOINT CONVENTION

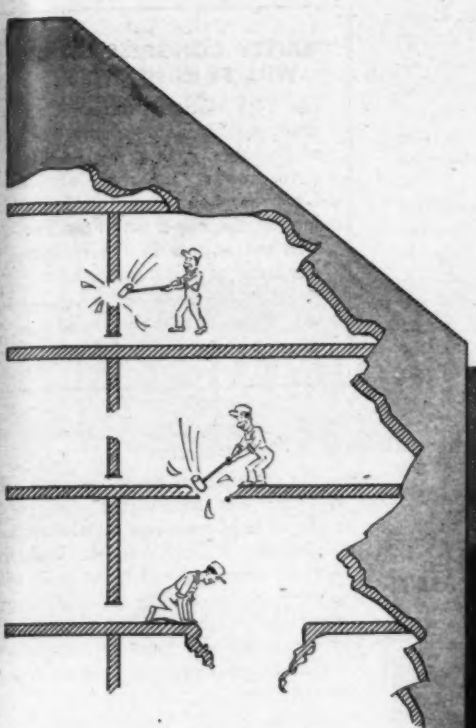
Current problems which have arisen from the present paper shortage confronting the paper industry and marketing facilities of the industry were discussed at a joint convention of the Southern Paper Trade Association and the Southwestern Paper Merchants Association, September 20, held at the Buena Vista Hotel, Biloxi, Mississippi.

President of the Union Bag and Paper Company, Roderick Davis, told the convention what steps were being taken by the kraft manufacturers to solve existing problems and to combat forces hampering production. Mr. Davis stressed the importance of cutting and storing wood during the summer months and of using mechanized wood cutting devices as means of insuring year-round output of paper. He also accounted for the shortage of paper being due to the lack of imports from Scandinavian producers; and he suggested that the situation would not be remedied until OPA prices were increased sufficiently to allow Scandinavian manufacturers ample return to meet increased production costs.

Editor of the *American Paper Merchant*, Phil A. Howard, in speaking before the convention, stated that the paper shortage was "directly attrib-

TEAR OUT YOUR FLOORS!

INSTALL A MODERN ROLL-HANDLING SYSTEM



The Cleveland Tramrail roll grab picks up rolls, sets them down or turns them from vertical to horizontal position or vice versa. All motions are motor-driven and controlled by the crane operator in the cab.

If you are struggling with the problem of storing and handling paper rolls in a multi-floor building with low ceilings as illustrated above, we say, "Tear out your floors and install a modern Cleveland Tramrail roll-handling system."

You then will have a single large, light, airy room in which several times as many rolls can be stored as on individual floors. Even if all of your present building is not required for roll storage purposes, you may find it profitable to make this change because of the tremendously increased capacity and the drastic reduction in roll-handling costs.

With a Cleveland Tramrail system, rolls can be stored vertically 42 feet and higher and the entire floor area utilized. Different types of paper are easily stored and retrieved. One man working in the crane cab usually can handle all operations in a large warehouse.

Let a Cleveland Tramrail engineer give you the details.

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BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

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THE CLEVELAND CRANE & ENGINEERING CO.
1165 EAST 283RD ST. WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

GREEN BAY, WIS. GAVE LAYNE A BIG *OK*

Green Bay with her progressive business leaders, expanding population and rapidly growing industries has given a big OK to Layne Well Water Systems. With only one minor exception, all water producing equipment for the city bears the famous and always dependable name of Layne. That same foresighted preference which guided city officials was also true with her industries—Warehouse and Cold Storage Plants, Paper Mills, Public Service Companies, Breweries, Creameries, Milk Plants, Laundries, Soap Manufacturers, Food Processing Plants, Religious Charities, County Institutions, and many others.

The choice of Layne Well Water Systems was based upon proven performance and a definite knowledge of low operation cost. But in and near Green Bay, as elsewhere, Layne sturdy quality was not an overlooked factor.

Layne high efficiency Well Water Systems are precision built to very rigid standards of excellence. They embody the finest engineering features yet developed. For further convincing facts about Layne Well Water Systems and Layne high efficiency Vertical Turbine Pumps, write for literature. Layne & Bowler, Inc., General Offices, Memphis 8, Tenn.

HIGHEST EFFICIENCY

Layne Vertical Turbine pumps are available in sizes to produce from 40 to 16,000 gallons of water per minute. High efficiency saves hundreds of dollars on power cost per year.

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis, Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisiana Co., Lake Charles, La. * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Western Co. of Minnesota, Minneapolis, Minn. * International Water Supply Ltd., London, Ontario, Canada * Layne-Hispano Americana, S. A., Mexico, D. F.

LAYNE

WELL WATER SYSTEMS VERTICAL TURBINE PUMPS

utable to union activities." Mr. Howard said he believed that although union activities within the paper industry had not promoted damaging strikes, it was strikes in allied and interdependent industries which materially affected the production of paper.

W. G. Leathers, assistant secretary of the National Paper Trade Association of New York, suggested that the solution to the problems of the industry could best be found by overcoming internal difficulties before tackling external detrimental influences. Mr. Leathers reminded the convention that there can really be no return to normal times, since normal times exist only as there are changes, and it is necessary that the industry make adjustments to meet those changes.

◆

NEW OFFICERS ELECTED BY MICHIGAN DIV. SUPTS. ASS'N

The Michigan Division of the American Pulp and Paper Mill Superinten-

Walter Wolfe

dents Association held its first meeting of the season September 19 at the Park American Hotel, Kalamazoo, Michigan.

Following the dinner, the following new officers were elected to serve for the coming year:

Chairman—Walter F. Wolfe
1st Vice Chairman—W. H. Astle
2nd Vice Chairman—Herbert Johnston
Secretary-Treasurer—C. W. Cassell

◆

COMMITTEES OF WESTERN N. Y. GROUP EMPIRE STATE SECTION OF TAPPI MEET

Committee meetings of the Western New York Group of the Empire State Section of TAPPI were held September 5 under the chairmanship of Dr. A. H. Nadelman.

The activities program for the coming year was formulated, and plans made to hold meetings on the second Wednesday of each month. Included in these meetings will be at least two joint sessions of the Canadian and American sections. J. W. Youngchild, chairman of the speakers committee, outlined an interesting series of tentative speakers.

R. R. Rusch, International Paper Company, North Tonawanda, New York, is in charge of making notifications of the monthly meetings.

SAFETY CONGRESS STORY WILL BE IN NEXT ISSUE

The 34th National Safety Congress met in Chicago the week of October 7. In order to give a full report, the story of the Congress featuring the meetings of the Paper and Pulp Section will appear in the November issue of this magazine.

Watch for complete data on the Contest with a list of the trophy winners.

◆

SECOND ANNUAL PULPWOOD THINNING CONTEST TO BE HELD IN SOUTH CAROLINA

The second annual five-acre pulpwood thinning contest for South Carolina was announced September 29 at Columbia, South Carolina, by the Clemson College Extension Service and the State Forestry Commission. The contest will follow the pattern of the 1945-46 event which was effective and successful in stimulating interest among the farmers in the state in cutting pulpwood on their own lands and with their own labor along the lines prescribed by good forestry practice.

◆

COMING EVENTS

Nov. 14-16—Joint meeting Southern and Southeastern Divisions American Pulp and Paper Mill Superintendents Association, George Washington Hotel, Jacksonville, Fla.

Nov. 22-23—Pacific Coast Division American Pulp and Paper Mill Superintendents Association, New Washington Hotel, Seattle, Wash.

Dec. 2-7—17th National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York City.

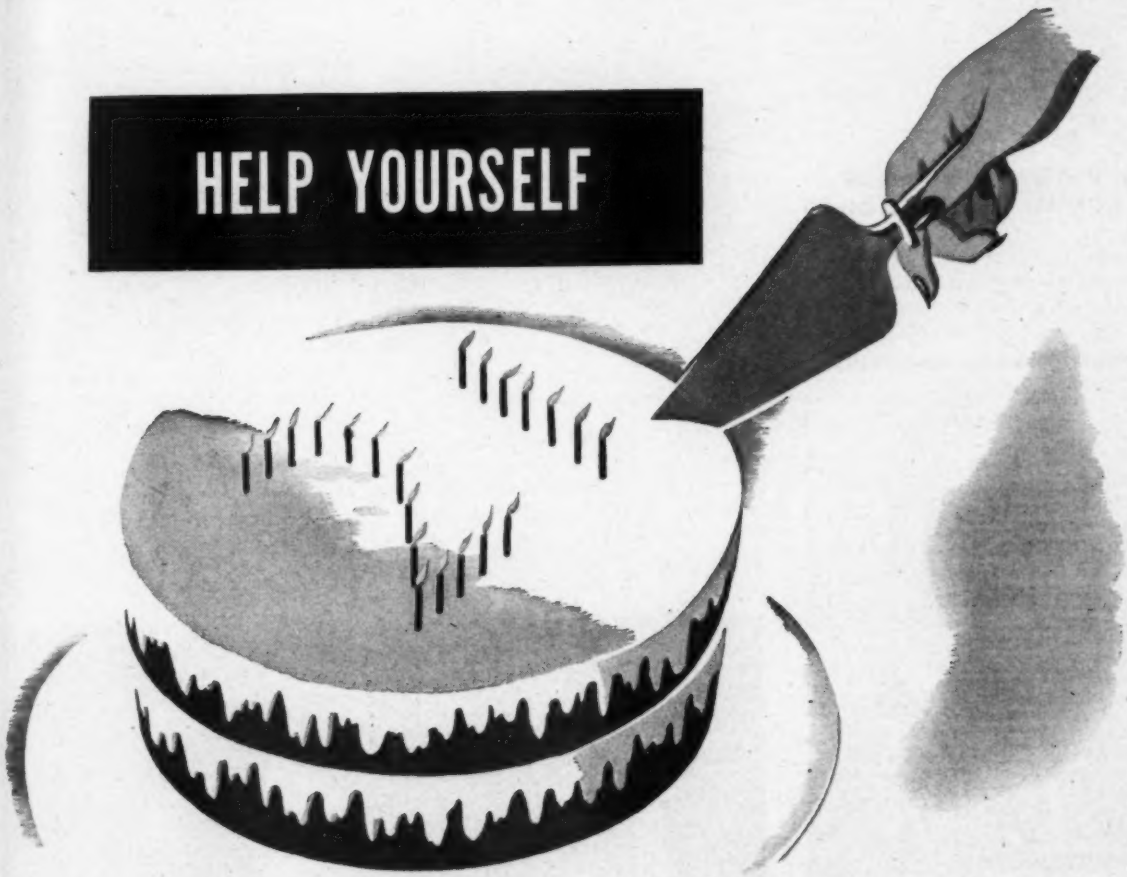
STATED MEETINGS

Chicago Professional Paper Group meets the third Monday of each month at Chicago Bar Association, Chicago.

WORLD'S LARGEST PRODUCER OF SYNTHETIC RESINS

RCI

HELP YOURSELF



TO MATCHLESS EXPERIENCE

Twenty-one years ago RCI was little more than an idea. Today it is the world's largest producer of synthetic resins. This growth is important to you because it is the result of constant research and constant production of basically better products. Today RCI resourcefulness is proving its worth in a continuous outpouring of new products to help industry meet current material shortages. If you use resins for any purpose and are handicapped by current scarcities, get in touch with RCI. The chances are excellent that RCI has developed a replacement product that will solve your problem—or can develop one that will.

REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan

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Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Tuscaloosa, Alabama • Liverpool, England • Paris, France • Sydney, Australia

SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

NEW DIVISIONAL CANADIAN OFFICES OPENED BY CALCO

Formation of the Calco Chemical Division, North American Cyanamid Limited, has been announced. The division will distribute a complete line of dyestuffs, chemicals, and intermedicates to the paper, plastic, textile, leather, and pharmaceutical industries.

William H. Kieffer

Sales offices and warehouses will be maintained in Montreal and Toronto; and laboratories and technical services have been established to provide efficient customer service under operation of the new division.

William H. Kieffer, who has been associated with Calco since 1936 and has for the past few years worked with the sales and product development division of the company, has been named manager of the new Canadian development. He will direct the sales and administrative functions of the Calco Division.

Location of the main office of North American Cyanamid Limited will be at Victoria Avenue and Bute Street, St. Lambert, Montreal, and subsidiary offices will be located at the Royal Bank Building, Toronto 1, Canada.

▶▶▶ COMPLETION OF THE NEW sulphuric acid plant being built by H. K. Ferguson Company for A. F. Pringle & Company, Incorporated, at Charleston, South Carolina, is expected about October 10. The new plant replaces a box chamber acid plant destroyed by fire last February. Production facilities consist of six Mills-Packard Chambers.

◆

▶▶▶ SALES OFFICES OF the Heppenstall Company (Pittsburgh, Pennsylvania) in Philadelphia will be moved from the Drexel Building to Room 1446, The Broad Street Station Building, Philadelphia 3.

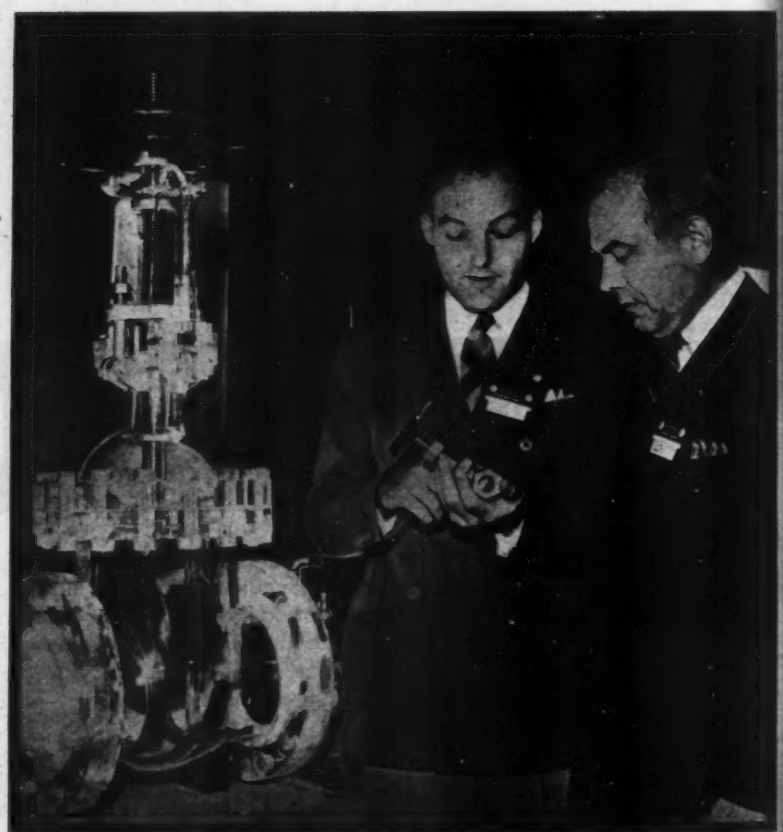
▶▶▶ THE CORPORATE NAME of the Sier-Bath Gear Company, Incorporated, North Bergen, New Jersey, has been changed to Sier-Bath Gear and Pump Company, Incorporated, in order to truly represent the company's expanded line of products.

◆

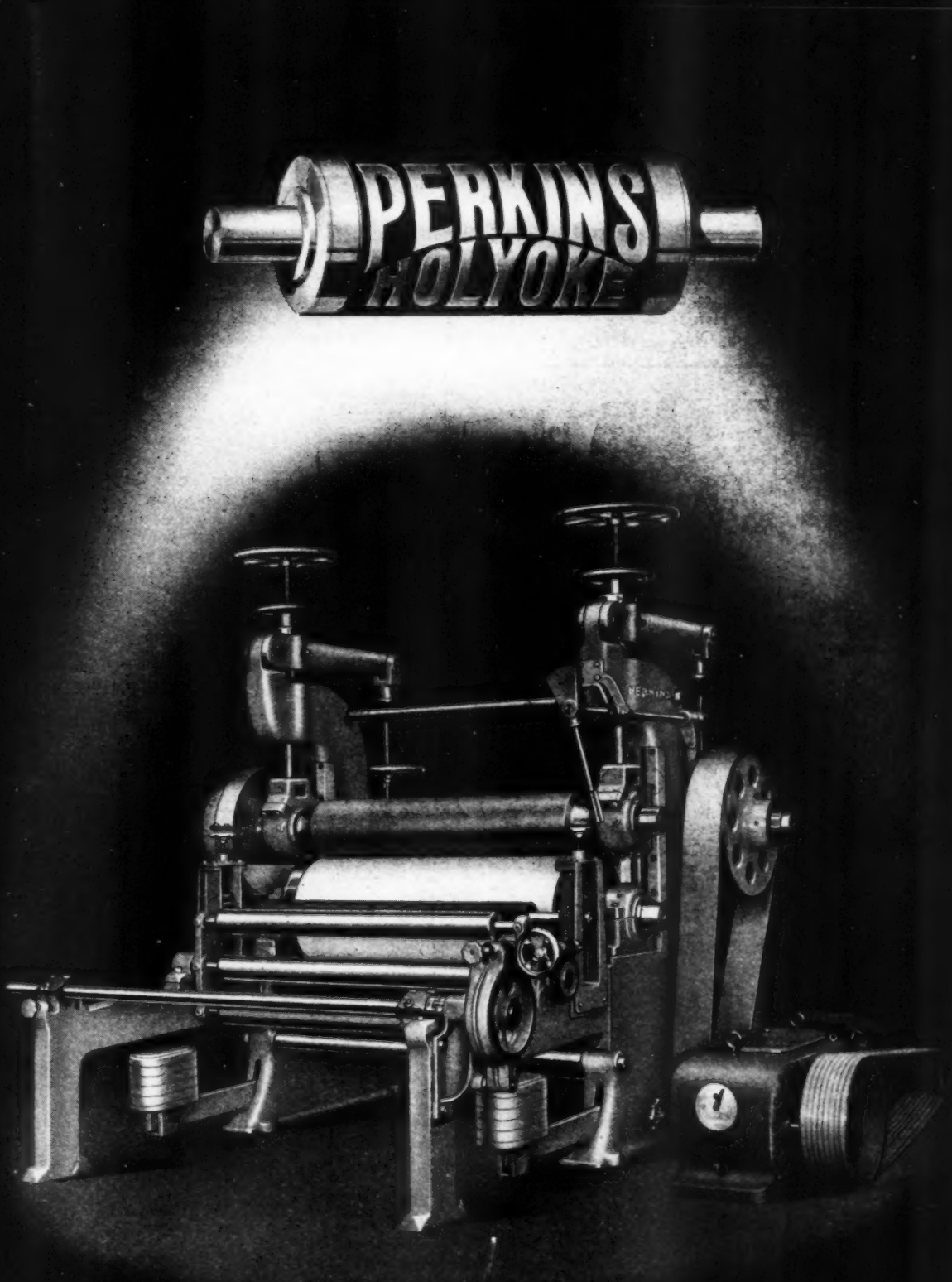
▶▶▶ ANNOUNCEMENT HAS BEEN made by the American Brake Shoe Company, New York City, that construction has begun on a new plant in Niles, Ohio, which will be used in the manufacture of railroad journal bearings. It is expected the plant will be completed in about six months. Operation of the new unit will be under the National Bearing Division.

◆

▶▶▶ AN EXHIBITION DISPLAYED by The Ohio Injector Company, Wadsworth, Ohio, at the 63rd Annual Convention of the National Association of Power Engineers held recently in Cleveland was a chief attraction. OIC exhibited a plastic model of a steel gate valve of its manufacture. The transparency of the model allowed an internal view of the workings of the valve.



Shown with the plastic valve at the Ohio Injector exhibit are: Left—Wm. G. Shephard, Cleveland representative for OIC, and Howard G. Doster, OIC vice president and chief engineer



B. F. PERKINS & SON, Inc.

HOLYOKE, MASS., U.S.A.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

BECAUSE OF INCREASES in new construction and modernization of central station, industrial, and marine power plants, Bailey Meter Company, Cleveland, Ohio has added eighty field engineers to its staff. The new staff members will be located in thirty industrial areas throughout the United States and Canada.

◆

▶▶▶ NEGOTIATIONS FOR the the sale of the Morrison stitcher business to Acme Steel Company, Chicago, have been completed by the Harris-Seybold Company, Cleveland, Ohio. Coupled with assigning the manufacture of small presses to its Seybold Division, the sale of the Morrison stitcher will increase the H-S company's volume of production of presses and cutters.

◆

▶▶▶ A BROCHURE RELEASED by The B. F. Goodrich Company, Akron, Ohio, describes the new research center which has been established at Brecksville, Ohio. The booklet combines a digest of the activities and facilities of the center with attractive illustrations done in wood-cut style. The publication is printed in two colors on a heavy offset paper which adds to the interest of the descriptive matter.

◆

MONSANTO NEGOTIATING TO PURCHASE STYRENE PLANT FROM GOVERNMENT

The War Assets Administration government-owned Texas City, Texas, styrene plant which was built and operated by the Monsanto Chemical Company (St. Louis, Missouri) during the war for processing synthetic rubber is to be bought by Monsanto contigent on approval by the Department of Justice and the Rubber Reserve. The purchase price of the plant is $9,550,000.

Negotiations involving the acquisition of the Texas City operation are part of a program to expand Monsanto's polystyrene plastic production to a rate of more that 80 million pounds by 1947. The plastics expansion program also includes the enlargement of the Plastics Division plant at Springfield Massachusetts.

◆

GENERAL CHEMICAL COMPANY BUILDS ALUMINUM SULPHATE PLANT AT JOHNSONBURG, PA.

Construction of a new chemical producing plant has begun near Johnsonburg, Pennsylvania. The operation is an addition to the facilities of the General Chemical Company, a subsidiary of Allied Chemical and Dye Corporation, New York City.

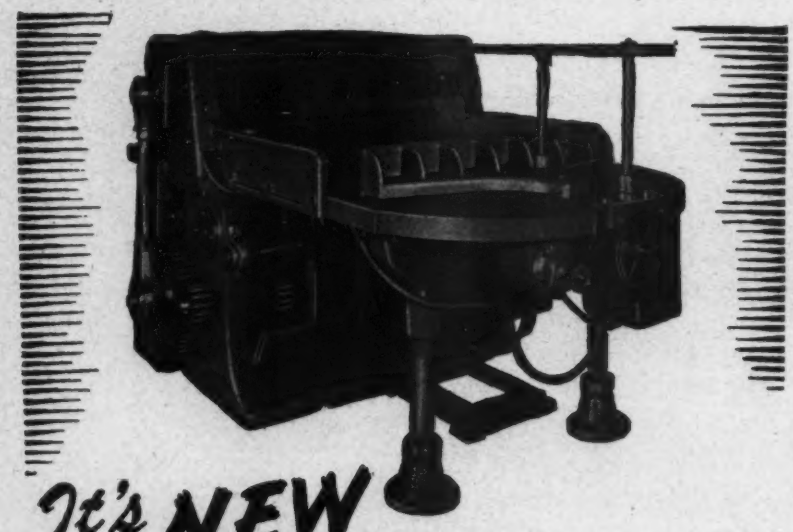
The new plant will produce aluminum sulphate, and it is strategically located to serve large paper manufacturing plants in that area.

◆

▶▶▶ FOUNDATION WORK has begun on the new plant which The Foxboro Company Limited, affiliate of The Foxboro Company, Foxboro, Massachusetts, is erecting in Montreal. The completed building will be ready for occupancy in the spring of 1947. Machining, metal finishing, and other basic operations in the manufacture of automatic control instruments, as well as assembly and calibration of the instruments, will be carried on at the Montreal plant.

◆

▶▶▶ PURCHASE OF A PLANT at Fort Wayne, Indiana, by General Electric Corporation, will increase production facilities for the manufacture of fractional horsepower motors. During the war, turbosuperchargers were produced at the Fort Wayne plant. It was purchased from the Reconstruction Finance Corporation at a cost of $5,000,000 to G-E.



It's NEW

SMITH & WINCHESTER
MODEL "E"
UNDERCUT TRIMMER

A NEWLY designed Undercut Trimmer retaining the outstanding features of the Smith & Winchester Standard Undercut with many new features, for fast, safe, accurate, more convenient operation. Features include: Heavy one-piece base frame; hinged front table to take away stock from cutter after cut; knife, to cut stock, raises from below the table; anti-friction bearings on drive shaft; disc type friction clutch; back gauge operated by variable speed, reversible motor for close setting; push button controls; illuminated index tape.

The Model "E" Undercut meets the needs of the modern finishing department for high production, accurate trimming and safe operation.

Makers of PAPER BAG and PAPER MILL MACHINERY

Investigate the new Model "E" for your peacetime needs. Bulletin giving full particulars mailed on request.

THE SMITH & WINCHESTER
Manufacturing Company
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Serving the Paper Industry Since 1828

Everything in Piping for Pulp and Paper Machines

ONE SOURCE OF SUPPLY
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STANDARD OF QUALITY

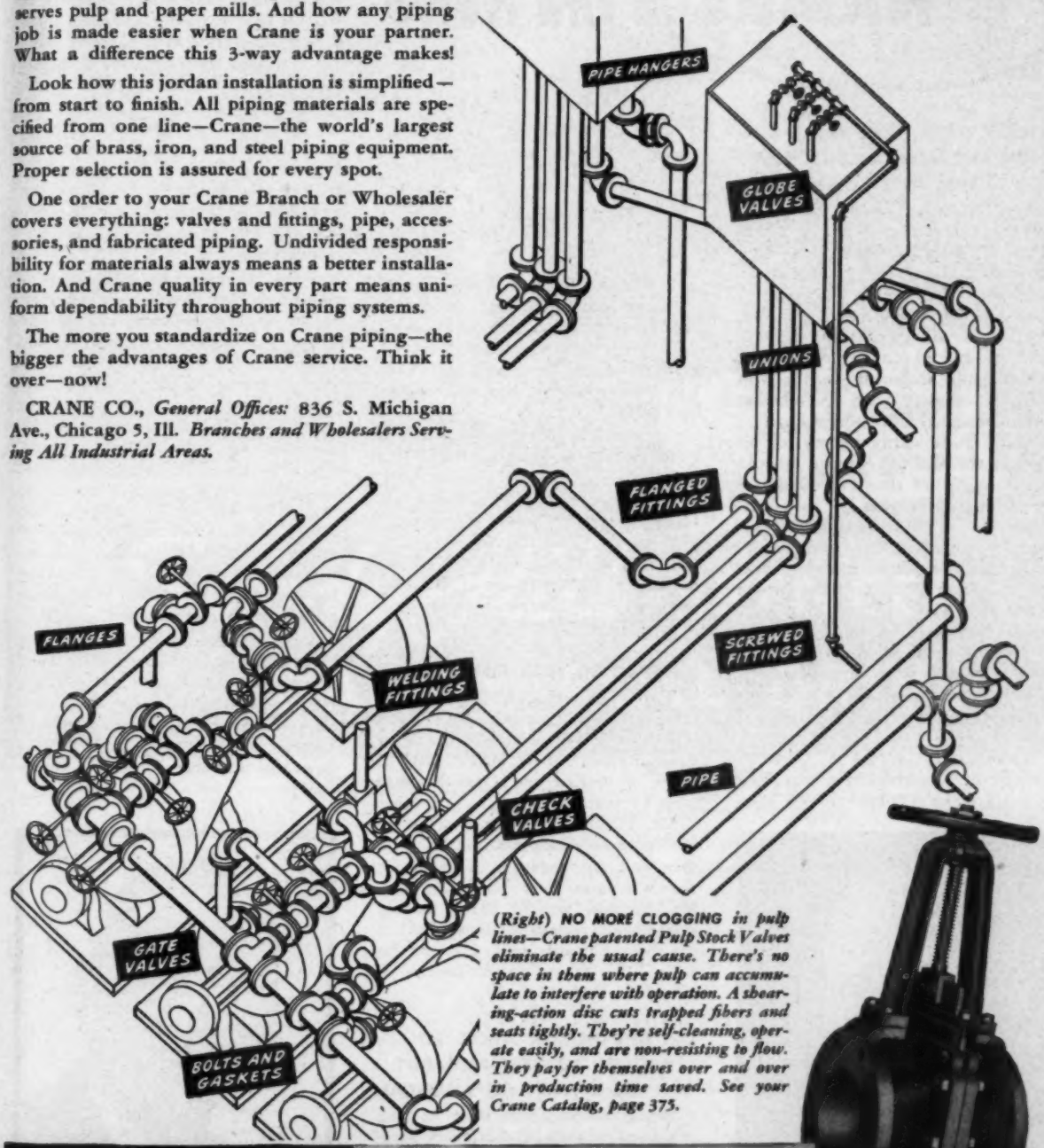
Here's an example of how *completely* the Crane line serves pulp and paper mills. And how any piping job is made easier when Crane is your partner. What a difference this 3-way advantage makes!

Look how this jordan installation is simplified—from start to finish. All piping materials are specified from one line—Crane—the world's largest source of brass, iron, and steel piping equipment. Proper selection is assured for every spot.

One order to your Crane Branch or Wholesaler covers everything: valves and fittings, pipe, accessories, and fabricated piping. Undivided responsibility for materials always means a better installation. And Crane quality in every part means uniform dependability throughout piping systems.

The more you standardize on Crane piping—the bigger the advantages of Crane service. Think it over—now!

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas.*



(*Right*) **NO MORE CLOGGING** *in pulp lines—Crane patented Pulp Stock Valves eliminate the usual cause. There's no space in them where pulp can accumulate to interfere with operation. A shearing-action disc cuts trapped fibers and seats tightly. They're self-cleaning, operate easily, and are non-resisting to flow. They pay for themselves over and over in production time saved. See your Crane Catalog, page 375.*

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CRANE

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

FOR EVERY PIPING SYSTEM

ROBERT WOLF TO RETIRE— HOWARD MORGAN SUCCEEDS HIM AT WEYERHAEUSER

Since Weyerhaeuser Timber Company built its first pulp mill in 1931, Robert B. Wolf has been manager of that company's sulphite pulp mill at Longview, Washington. Announcement has just been made that Mr. Wolf plans to retire in May, 1947.

Mr. Wolf ranks among the leading sulphite pulp authorities in the pulp and paper industry, with which he has been connected for almost half a century. He is widely known for his work in the scientific control of pulp manufacture and the development of bleaching methods. He has been connected with many large companies including Pulp Bleaching Corporation, International Paper Company, Union Bag and Paper Company, and Brown Company (when it was known as Burgess Sulphite Fibre Company). His connection with Spanish River Pulp & Paper Mills was interrupted by World War I. After the war, he organized the engineering firm known as Wolf & Hill.

Appointed to succeed Mr. Wolf as manager of Weyerhaeuser's Pulp Division at Longview is Howard W. Morgan, who has been vice president of Munising Paper Company, Munising, Michigan. He already has taken up his duties in Longview. Mr. Morgan is a graduate of the New York State College of Forestry. He also is a member of TAPPI.

R. B. Wolf

PERSONALS

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▷▷▷ Succeeding *Eugene Bashore* as director of Rayonier, Incorporated, *Jonathan B. Lovelace*, president of Capital Research and Management Corporation, Los Angeles, has been elected to the board. *William F. Weber* has been elected secretary of the company; all other directors were retained, and the same officers reappointed.

◆

NEPCO 50-YEAR MEN RETIRE

Two old-timers who recently retired after serving more than 50 years with the Nekoosa-Edwards Paper Company are Albert Helke with 52 years of service and Otto Krehnke with 51 years.

Mr. Helke was beater engineer in the company's Nekoosa mill. He will spend his retirement on his farm on the Wisconsin river below Nekoosa. Mr. Krehnke was in charge of the maintenance reclaiming department at the Port Edwards mill. He and his wife have taken up retirement at Litchfield Park, Arizona.

◆

DR. BERNHEIMER ASKED TO RETURN TO GERMANY—BUT HE IS NOW AN AMERICAN

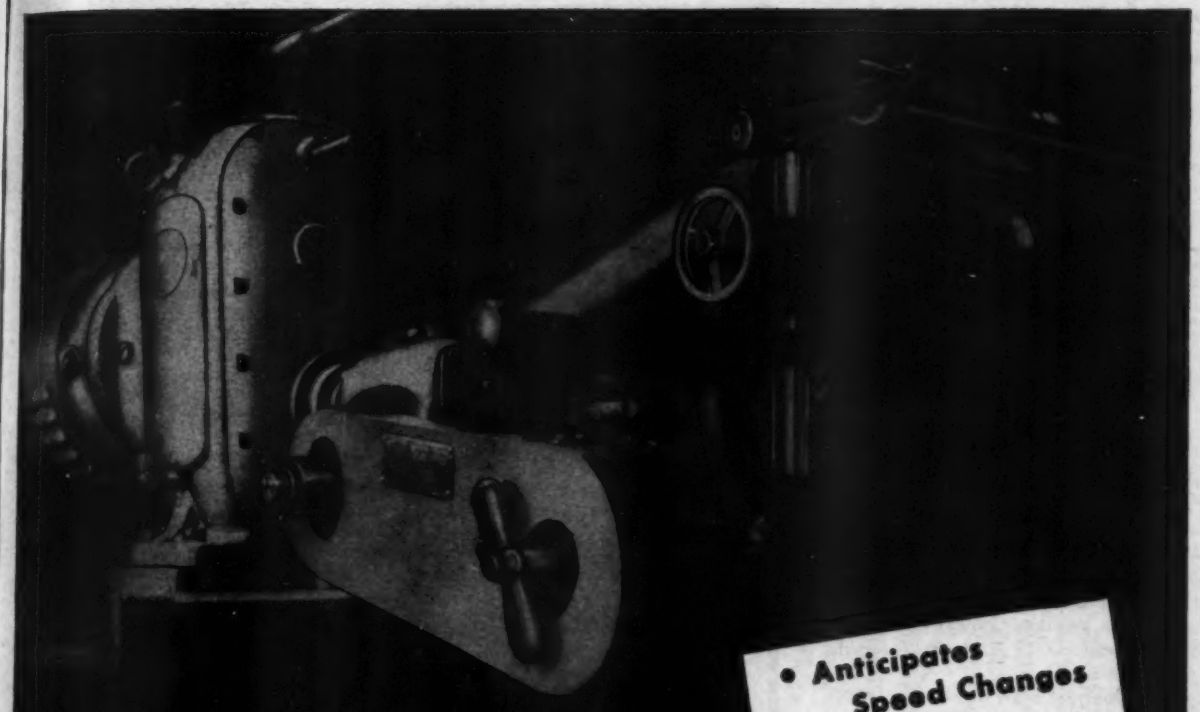
While visiting the office of this magazine recently, Dr. Norbert Bernheimer stated that he and his associates who had operated in Germany before the war under the name of Vogel & Bernheimer have been urged by employees of that company to return and to take up the work there as before.

Vogel & Bernheimer Zellstoff-und Papierfabriken Inc. operated a sulphite pulp mill at Maxau, Rhine, and a papermaking plant at Ettlingen, Baden, which manufactured strong sulphite papers and cardboard, also kraft papers and board. Dr. Bernheimer came to the States in 1938 after his mills had been taken over by the Nazis. He was in this country on a temporary visa for four years during which time he was not permitted to accept a position. He then was connected with the Brown Company for special research on a prospective postwar program, and for a year he was supervisor of pulp manufacture with Hollingsworth & Whitney Company, Waterville, Maine. In May of this year, he established his own office in Waterville as a consultant for the procedure of sulphite manufacture.

Since beginning his business as a consultant, Dr. Bernheimer states he has become an American citizen and is not interested in returning to his native country to take up the work there. Having visited a number of large sulphite mills in the States and in Canada, Dr. Bernheimer says he considers these mills are more progressive in construction, equipment, and, some of them, in manufacturing control than the mills in Europe. He points out, however, that the European mills *do* stress economic operation, that is, they endeavor to obtain the ultimate in capacity from their plants rather than overexpand.

Dr. Bernheimer was a student of Dr. Schwalbe at Eberswalde, Germany, and a graduate of Darmstadt. He is recognized as having done considerable research in the chemistry of Mitscherlich pulping and his firm in Germany was one of the first to use this process.

Dr. Norbert Bernheimer



- Anticipates Speed Changes
- Eliminates Drag

Sandy Hill-SPENCER DANDY ROLL DRIVE

Increased Sharpness of Watermark

This drive was developed primarily for controlling dandy speed compared with the speed of the wire resulting in a far superior watermark in clarity of outline. However, it also improved the sheet so that the machine could be speeded up twenty-five per cent on equal quality.

THE unit as manufactured by Sandy Hill is covered by patents both in the United States and Canada. An important feature of this design is that weighting of one side more than another is completely eliminated. The drive shafting will permit the Dandy Roll to follow any slight oscillation of the wire from side to side.

Better Formation at Higher Speeds

The Sandy Hill-Spencer Dandy Roll Drive facilitates fibre formation and closing, enhancing the finish of the sheet. It gives more even distribution in laying the sheet and perfect control for "localizing."

THE SANDY HILL IRON & BRASS WORKS
HUDSON FALLS, N. Y.

DR. LACEY GIVEN NEW POST WITH CALCO CHEMICAL DIV.

Since 1932 Dr. Harold Talbot Lacey has been associated with Calco Chemical Division, American Cyanamid Company, Bound Brook, New Jersey.

Prior to announcement of his new appointment, Dr. Lacey was chief chemist of the Pigment Division. He is now senior chemist of the new Willow Island Works and a member of the technical committee of the Calco Marietta Works, Marietta, Ohio.

Before his connection with Calco, Dr. Lacey was with the Grasselli Chemical Company as research chemist.

◆

ROCKWELL TO HEAD PAPER MAKERS CHEMICAL DEPT.

Succeeding Ralph B. McKinney, who passed away September 21 (see Necrology), Reginald Rockwell, former assistant general manager of the Paper Makers Chemical Department, Hercules Powder Company, has been appointed general manager of the department.

Throughout most of Mr. Rockwell's business career he has been active in the manufacture of materials used in the paper industry. He joined Hercules in 1922 at the Brunswick, Georgia, naval stores plant, and later worked at the Hattiesburg, Mississippi, plant where he became assistant superintendent. Mr. Rockwell returned to the Brunswick plant in 1938 as superintendent. During the war years he managed the Volunteer Ordnance Works at Chattanooga; and in 1944 he became assistant general manager of the PMC department.

◆

ABIJAH FOX MADE BOARD CHAIRMAN OF MATHIESON

Election of Abijah U. Fox as chairman of the board of directors of the Mathieson Alkali Works, New York City has been announced by George W. Dolan, president of the company. Mr. Fox recently returned to the United States from Europe where he served as Deputy Director, Finance Division, U. S. Military Government, Germany.

After the time of his graduation from Rutgers University, Mr. Fox was assistant manager of the National City Bank in Tokyo, which position he held for eight years. In 1934 he joined the firm of Swann, Culbertson & Fritz, an affiliate of Hayden Stone & Company. With this latter organization he was a managing partner in the Shanghai office.

Mr. Fox returned to the United States in 1941 joining the Treasury Department at that time.

Dr. Harold Talbot Lacey

Reginald Rockwell

Abijah Fox

RAWSON SUCCEEDS HOLT AS MANAGER OF MARATHON AT MENOMINEE, MICH.

Resident manager of the Marathon Corporation's plant at Menominee, Michigan, will be Donald C. Rawson, who succeeds George W. Holt who has resigned.

Mr. Rawson has been associated with Marathon since 1933 during which time he has held supervisory positions in the maintenance and production departments. His former affiliations in the industry include the superintendency of the Economy Paper Company of Milwaukee.

Mr. Holt resigned from Marathon to accept the position of president and general manager of Accepted Products Company, San Francisco, a concern which manufactures paper specialties.

◆

MANAGEMENT PROMOTIONS AT BIRD & SON, INC.

Promotions involving top management officials of Bird & Son, Incorporated, East Walpole, Massachusetts, have been announced by the board of directors. Axel H. Anderson, recently elected president of the company, has been replaced in his former capacity as secretary-treasurer by Wesley C. Ahlgren, former assistant secretary-treasurer.

Election of divisional vice presidents has also been announced. The newly elected division heads will assume their duties immediately. They are: H. Eugene Sawyer, Jr., flooring division, production and sales; Eli L. Chamberlain, building material division, production and sales; Ralph A. Wilkins, paper products division (including dry felt), production and sales; and Richard C. Floyd, who will continue as vice president and consultant.

◆

SOME EXECUTIVE AND BOARD CHANGES AT GAIR COMPANY

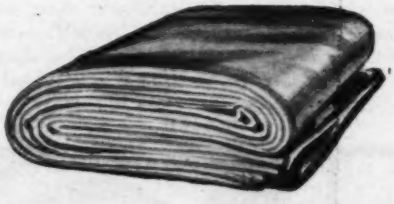
On October 1, Norman F. Greenway resigned from the board of directors and as first vice president of the Robert Gair Company, Incorporated, (New York). He will continue with the company as vice president in charge of folding carton operations. Sumner R. Cahoon becomes vice president in charge of container operations, and Herman Whitmore has been made vice president in charge of boxboard operations.

At a meeting of the board of directors of Gair Bogota Corrugated & Fibre Box Corporation, Bogota, New Jersey, Floyd C. Costello, vice president and manager of the organization was elected a director of the corporation.

Put the ACCENT where it belongs

SUL*FIGHT*
SELL*ULOSE*
***PAY*PER**

No matter how you spell them, those words should always be accented as indicated. The *fighting* toughness and the *sellability* of your product govern the price your customers will *pay* for it . . . The speed and economy with which you convert pulp into paper or board govern your costs and your profits.



No matter what pulp you use — domestic or imported, straw, chip, ground wood, sulphite, sulphate or rag—you can make your product better, faster and at less cost by equipping your machines with Hamilton Felts. Better, because Hamilton Felts give stronger and smoother formation to your sheets. Faster, because Hamilton Felts remove more water per second at all speeds of the machine. At lower cost, because Hamilton Felts reduce the amount of steam that is necessary to complete drying.

• From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •

J. C. Leonard

▶▶▶ Associated with Oakite Products, Incorporated, New York, for twenty-two years, and for the past 16 years manager of the Chicago Division, *J. C. Leonard* assumed the position of sales manager of the industrial marketing division of the company September 1. Mr. Leonard will direct the marketing and servicing activities of the industrial field staff from the New York office.

◆

GERALD ALCORN LEAVES EVERETT TO MANAGE NEW SULPHATE MILL AT LONGVIEW

Appointment of Gerald F. Alcorn, of Everett, Washington, as manager of the new sulphate mill being constructed in Longview (Wash.) has been announced by the pulp division of the Weyerhaeuser Timber Company.

Mr. Alcorn has been associated with the pulp division of the company for 15 years. Since 1936 he has been technical director of the Everett mill until he became manager a year ago. Mr. Alcorn is succeeded at Everett by Russ J. LeRoux, who returns to that position from which he resigned a year ago.

◆

PAUL W. BIDWELL ELECTED GENERAL MANAGER-TREAS. HOLYOKE MACHINE COMPANY

Formerly general manager of B. F. Perkins & Son, Incorporated, and prior to World War II general superintendent of White & Wyckoff Manufacturing Company, Colonel Paul W. Bidwell has been elected treasurer and general manager of the Holyoke Machine Company, Holyoke, Massachusetts.

Colonel Bidwell served during the war with the Army Ordnance Department. His most recent business affiliation has been with the Chicopee, Massachusetts, plant of American Bosch Corporation, which he managed. In his position as treasurer and general manager of Holyoke Machine, Colonel Bidwell succeeds Herbert L. Frink, who has retired after thirty years of service with the company.

◆

▶▶▶ Sales representative for the E. P. Lawson Company, Incorporated, (New York City) in the Pennsylvania, West Virginia, Maryland, Deleware, and New Jersey territories will be *John T. Renshaw.*

◆

▶▶▶ Election by the board of directors of the Johns-Manville Corporation has placed *Lewis H. Brown,* president of the company since 1929, as chairman of the board and chief executive officer. *R. W. Lea* has been elected president, *Alvin Brown* has been named to succeed Mr. Lea as vice president for finance and as a member of the board, and *John P. Syme* has been elected vice president and assistant to the chairman of the board.

◆

▶▶▶ Midwestern regional sales manager for The General Detroit Corporation, Detroit, Michigan, will be *Gail Rutledge* who will make his headquarters in the corporation's Chicago branch office. He will supervise sales in the states of Illinois, Wisconsin, Minnesota, and South Dakota. Mr. Rutledge has been manager of the Philadelphia office and assistant vice president and co-ordinator of national accounts and branch operations for General Detroit. Succeeding him in the latter position is *Harold J. O'Neill.*

DR. FREED NAMED CHIEF CHEMIST AT MONSANTO'S CLINTON LABORATORIES

Formerly assistant professor of chemistry at the University of Chicago, Dr. Simon Freed has been named chief chemist at Monsanto Chemical Company's Clinton Laboratories, Oak Ridge, Tennessee. The laboratories are operated by Monsanto under contract with the Manhattan District as a research project connected with the Oak Ridge Atomic Energy development.

Dr. Freed is a native of Poland and has studied at the Massachusetts Institute of Technology, the University of Paris, and the University of California where he joined the staff as instructor in chemistry in 1927. He was a Guggenheim Fellow from 1930 to 1931 when he joined the faculty of the University of Chicago.

◆

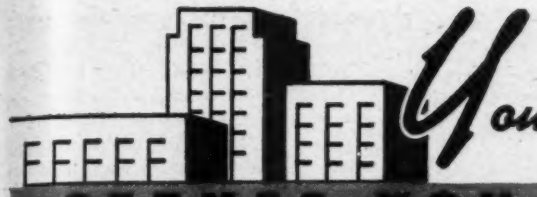
▶▶▶ Manager of the new Memphis (Tenn.) mill of Kimberly-Clark Corporation, Neenah, Wisconsin, will be *C. H. Eubank,* who for several years has been industrial relations director for the company at Neenah. J. C. Simonich has been appointed his successor in the industrial relations department and R. H. Kehl has become manpower director.

◆

▶▶▶ For many years chief engineer in various mills of the American Writing Paper Corporation, Holyoke, Massachusetts, *James B. Tiffany, Sr.,* has moved from Holyoke to Phoenix, Arizona, where he will make his home. In 1942, he left American for service with the Navy. Since his discharge he has been acting chief engineer for the Newton Paper Company.

Gail Rutledge

Harold J. O'Neill



Your OIC valve distributor

SERVES YOU IN MANY WAYS

Your industrial distributor is a good man to do business with . . . a good friend to have in emergencies . . . a source of constant aid to your operations. He is a member of your business community, so he understands your problems and tries to anticipate your needs. He's close at hand when you need him. Here are just a few of the countless ways in which he serves you:

CONVENIENT STOCKS

Your OIC valve distributor knows your needs and tries to maintain his stocks accordingly. That enables you to keep your own parts and materials inventories low . . . saving you capital investment, storekeeping expense and loss from obsolescence.

ON-THE-SPOT TECHNICAL AID

Years of experience in handling the problems of many industries makes the OIC valve distributor a valuable adviser. He knows the products that will do the best job under specified circumstances. He keeps abreast of latest technical developments.

IMMEDIATE INFORMATION

Just telephone your OIC valve distributor for immediate price and catalog information. He can either give you the answers right away or get them for you quickly . . . saving you time, trouble and lengthy correspondence.

SECURING SCARCE ITEMS

If anyone knows where to get an unusual or scarce item, it's your distributor. He knows where to look, and has many contacts. In times of shortages, the distributor's efforts along this line have been a most important service to his customers.

EASIER PURCHASING

Buying is centralized when you make full use of a distributor's services in buying valves and the wide variety of other items he carries. That means you place fewer orders, receive fewer invoices, simplify your bookkeeping and purchasing activities.

PRODUCT DEPENDABILITY

Your OIC distributor stakes his own reputation on the quality of the products he sells. When he recommends OIC valves, you can trust his advice, for he must provide products that perform dependably and are *right* for your particular installation.

Check your distributor first

IT PAYS!

OIC

STEEL • IRON • BRONZE VALVES

THE OHIO INJECTOR COMPANY • WADSWORTH, OHIO

▶▶▶ Recent appointments in the steel and tube division of The Timken Roller Bearing Company, Canton, Ohio, have brought the following changes: *H. R. McLaren,* formerly superintendent of Tube Mills, has been made assistant general superintendent. *J. P. Wargo,* assistant superintendent of Tube Mills and finishing departments, becomes superintendent of Tube Mills. *R. R. Elsasser,* manager of the war-born Newton Falls (Ohio) plant, has been named assistant superintendent of Tube Mills.

◆

▶▶▶ Manager of the commercial research department of the Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, is the new appointment given *James R. Reed,* who has been with the company since 1941 in a statistical capacity. Other Allis-Chalmers appointments are: *Jerome F. Fitzsimmons,* supervisor in charge of research; *Anson J. Bennett, Jr.,* supervisor in charge of sales analysis.

◆

Appointment of *W. J. O'Brien,* vice president and director of the Glidden Company, Cleveland, Ohio, to a new executive position as chairman of a committee of Glidden executives in charge of manufacturing, research, and development, has been announced. The committee is made up of three other executives of the company, *R. V. Levenhagen, Paul E. Sprague,* and *Dwight P. Joyce.*

◆

▶▶▶ The election of *Lawrence J. Kavanagh,* of New York City, as assistant treasurer of the West Virginia Pulp and Paper Company has been announced. Mr. Kavanagh has worked for the company since 1920, holding consecutively positions as manager of the billing department, cashier in the Industrial Chemicals Division, internal auditor, and assistant to the treasurer.

◆

▶▶▶ Former general superintendent of the Hoberg Paper Mills, Green Bay, Wisconsin, *Edward Den Dooven* has assumed his new position as general superintendent of the Northern Paper Mills, of Green Bay.

◆

▶▶▶ Joining the development and research division of The International Nickel Company, *J. E. Fifield,* formerly of the United States Naval Research Laboratory and the American Brake Shoe Company, will make his headquarters at the New England technical section of the division, 75 Pearl Street, Hartford, Connecticut.

▶▶▶ Associated with the White River Paper Company, White River Junction, Vermont, for fifty-four years, *J. P. Kimball,* president of the company, has retired. Mr. Kimball served as treasurer of the company before he was elected to the presidency in 1943.

◆

▶▶▶ Sales representative for the Texas, Oklahoma, Arkansas, and Louisiana territory of The Flexible Steel Lacing Company (Chicago) will be *James Gillespie,* who succeeds his father, the late *J. W. Gillespie.*

James Gillespie

◆

▶▶▶ President of Zimmer Paper Products, Indianapolis, Indiana, and vice chairman of the Executive Committee of the Waxed Paper Institute, *Karl R. Zimmer* will serve as chairman of the committee for the remainder of the year. He succeeds the late V. H. Wilshire (see Necrology).

◆

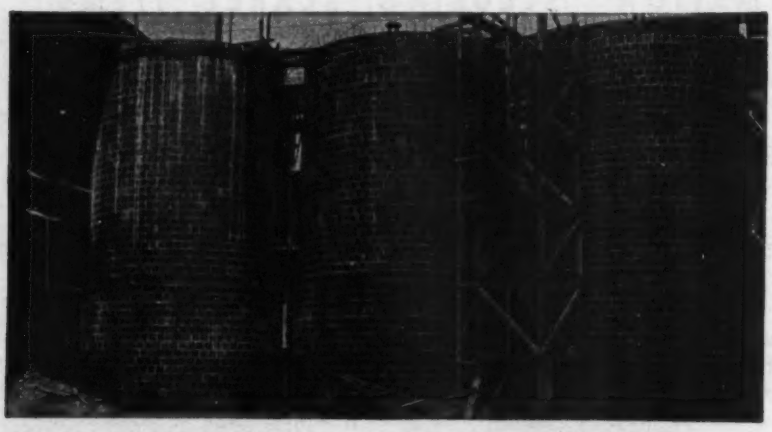
▶▶▶ A new member of the Southern Paperboard Corporation, Savannah, Georgia, *Roland Wilbur,* has assumed the duties of manager of manufacturing. For several years past, Mr. Wilbur has been production manager of the Crossett Paper Mills, Crossett, Arkansas.

◆

▶▶▶ Former secretary-treasurer of the Central Paper Company, Muskegon, Michigan, *C. P. Spindler* has been named general manager of Kurz & Root Company, Appleton, Wisconsin, manufacturers of generators.

◆

▶▶▶ Returning after four years of service with the Army *Stuart D. Distelhorst* has resumed his work as sales promotion manager with the Cochrane Corporation, Philadelphia. Joseph S. Oldknow, personnel manager of the company, who carried on during Mr. Distelhorst's absence, continues with layout and production of advertising and other printed matter, in addition to his office of personnel management.



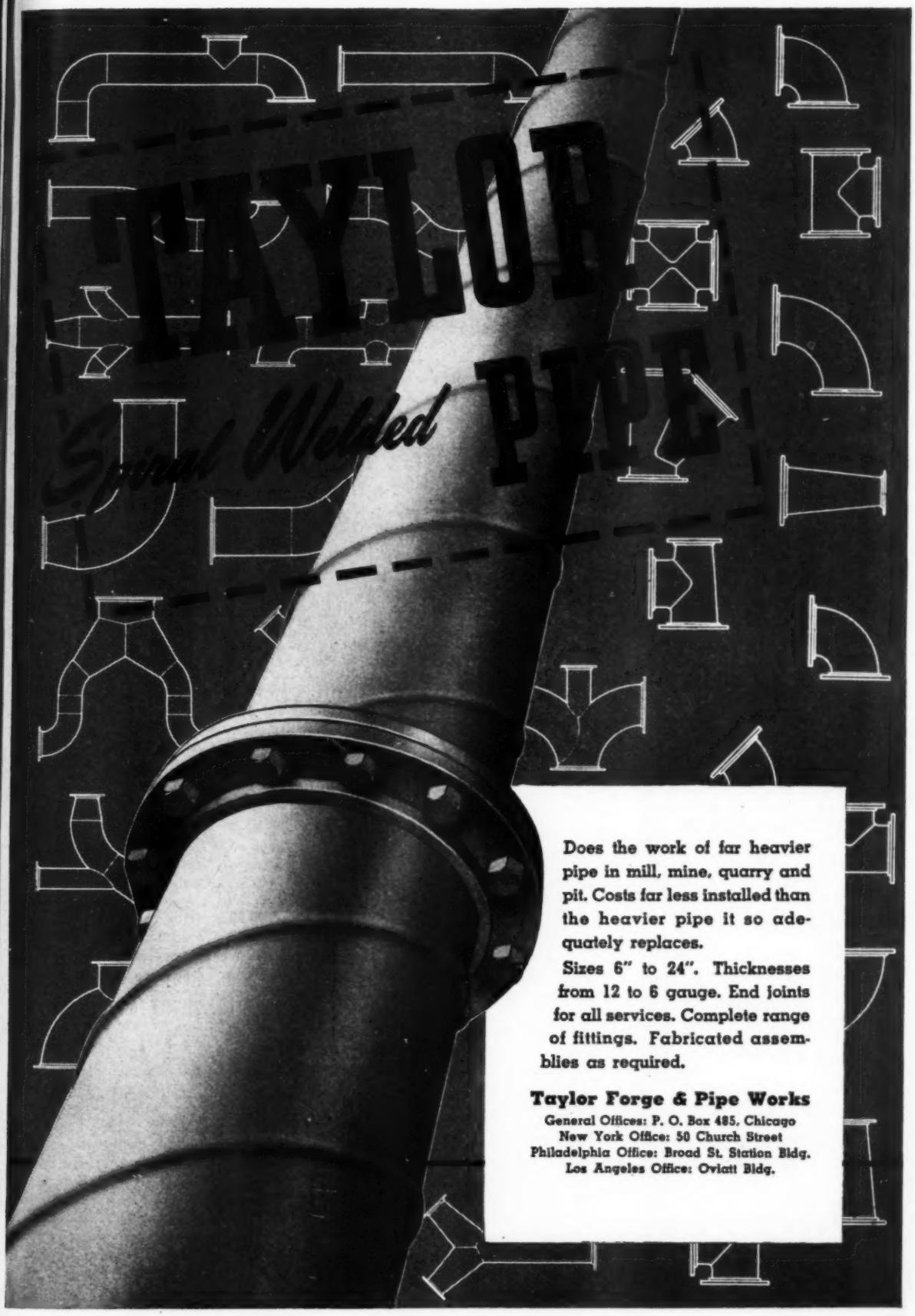
SEMTILE TANKS

The tanks shown above were designed and constructed by Stebbins of Semtile blocks which are hollow salt-glazed tile, cored in two directions to permit horizontal and vertical reinforcing. The tanks are easy to clean, prevent product contamination, and their durable construction insures long life.

Consult Stebbins and get the benefit of 62 years experience of engineering and installing tanks and linings.

Stebbins Engineering and Manufacturing Company

EASTERN BOULEVARD, WATERTOWN, NEW YORK



Does the work of far heavier pipe in mill, mine, quarry and pit. Costs far less installed than the heavier pipe it so adequately replaces.

Sizes 6" to 24". Thicknesses from 12 to 6 gauge. End joints for all services. Complete range of fittings. Fabricated assemblies as required.

Taylor Forge & Pipe Works

General Offices: P. O. Box 485, Chicago
New York Office: 50 Church Street
Philadelphia Office: Broad St. Station Bldg.
Los Angeles Office: Oviatt Bldg.

▶▶▶ Election of *Welthea M. Smith* as assistant secretary of the corporation has been announced by Bird & Son, Incorporated, East Walpole, Massachusetts. In the one hundred and fifty years since the company was founded, Miss Smith is the second woman to hold an elective position. Beginning her career in 1920, Miss Smith now holds the position vacated by Wesley C. Ahlgren who was elected secretary-treasurer of the Bird organization.

◆

▶▶▶ Formerly general sales manager for the McLaurin-Jones Company, Ware, Massachusetts, *E. Lee Turley* has been appointed vice president in charge of sales. Mr. Turley has been associated with the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin, as advertising manager. He was previously employed by the Kalamazoo Vegetable Parchment Company, Kalamazoo, Michigan.

◆

▶▶▶ Pacific Coast Regional Sales Manager of the Pigment Department, Calco Chemical Division, American Cyanamid Company (Bound Brook, N. J.) is *Wendell G. Beauchamp*, formerly superintendent of the Pacific Paint & Varnish Company, Berkeley, California, and Pacific Coast district sales manager for the United Color & Pigment Company, Newark, New Jersey. Since the purchase of United Color by American Cyanamid in 1944, Mr. Beauchamp has been with the Pigment Department of Calco Chemical Division.

◆

▶▶▶ Recently joining the sales promotion department of the St. Regis Paper Company, New York City, *William T. Volkhardt* will be in charge of market research. Formerly, Mr. Volkhardt was affiliated with the Bethlehem Steel Corporation as an industrial engineer. Prior to his association with Bethlehem, he was market research analyst for the Scott Paper Company. *James J. Weldon* has been transferred from the company's New York office to the southeastern division sales district. Mr. Weldon will specialize in multiwall paper bag sales in the Carolinas and Georgia, and will make his headquarters in Atlanta.

NECROLOGY

RALPH B. McKINNEY

General manager of the Paper Makers Chemical Department and director of Hercules Powder Company, Wilmington, Deleware, Ralph B. McKinney passed away September 21.

Mr. McKinney has been associated with Hercules since the organization of the company in 1913 when he became a member of the purchasing department. In 1922 he was made manager of the purchasing department, and in 1929 he became assistant manager of the explosives department. Three years later he again was named director of purchases.

Transfer of Mr. McKinney to the Paper Makers Chemical Department was effected in 1937 and in 1942 he was made assistant general manager of that department, becoming manager a year later. In January of 1945, Mr. McKinney was elected a member of the board of directors of the Hercules company.

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▶▶▶ President of John W. Bolton & Sons Company, Incorporated, Lawrence, Massachusetts, *William W. Bolton* passed away September 11. He was 57 years of age.

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▶▶▶ President of the Williams Apparatus Company, Incorporated, Watertown, New York, *Frank M. Williams* passed away September 20.

▶▶▶ Purchasing director for E. C. Atkins and Company, Indianapolis, Indiana, *Major Meridith Poole* passed away October 4. Mr. Poole was associated with the Atkins organization for forty-six years. In 1945, he was presented with a diamond-studded merit award and certificate by the company for his important work throughout the growth of the organization.

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▶▶▶ For forty-five years associated with the foundry and gear industry in Chicago, *John A. Sizer*, president and sales manager of the Industrial Gear Company (Chicago) passed away September 17. He is survived by his widow and a son.

◆

▶▶▶ Retired since 1943, the former superintendent of the Holyoke, Massachusetts, plant of the Hercules Powder Company, *Walter E. Carter*, passed away at his home in Round Pond, Maine, September 16. Mr. Carter began employment at the Holyoke plant of the Paper Makers Chemical Corporation before it became a division of Hercules. Before his retirement he was awarded a diamond-studded twenty-five year service pin by the Hercules company in recognition of his faithful service.

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▶▶▶ For twenty-five years accountant for the American Writing Paper Corporation, Holyoke, Massachusetts, *John W. Graham* passed away August 28, at the Providence Hospital in Holyoke.

◆

▶▶▶ President of The Thos. Phillips Company, Akron, Ohio, *Charles W. Seiberling*, passed away September 20. Mr. Seiberling was in his eighty-fifth year. He has been known as Akron's first citizen for many years, and has been active in many of that city's civic and charitable organizations. Together with his brother he founded the Goodyear Tire and Rubber Company and the Seiberling Rubber Company.

◆

▶▶▶ Suddenly at Biddleford Pool, Maine, *V. H. Wilshire* passed away August 28. Mr. Wilshire was president of the Specialty Papers Company, Dayton, Ohio, and chairman of the Executive Committee of the Waxed Paper Institute. He had been in the waxed paper business for more than forty years, starting with his father in Cincinnati in 1905 with the Waterproof Paper and Board Company. After the first world war, the company was reorganized and became the Specialty Papers Company.

"ARMOUR'S ANIMAL GLUE WORKS BEST FOR US"

that's right, Mister...

When it comes to paper sizing, Armour's Animal Glue *has proved it's good!* It is a time-tested, "natural" product—not a synthetic. And years of experience in the glue business go into the perfection of Armour's Animal Glue.

and that's not all...

Remember this about Armour's Animal Glue...

Easy to prepare
Easy to use
Completely uniform
Pure, clean, clear
High jelly strength
Chemically inactive
Tough and pliable
Does not deteriorate

• • •

Important: At present, demand for many grades of Armour's Glue exceeds supply. However, we'll gladly discuss your problems to help you make *more efficient use* of the glue that is available.

Armour's Animal Glue is easy to use... You can use Armour's Animal Glue *without complicated chemical additions!* Merely mix with water, melt and use.

It has no impurities . . . Armour's Animal Glue is commercially clean, clear and one hundred per cent glue. This purity, plus high jelly strength, viscosity and tensile strength, means better sizing.

It's particularly good for beater and surface sizing . . . Armour's Animal Glue is chemically inactive on paper—there's no oxidizing, discoloring, flaking or shedding. It's grease-free . . . tough, pliable, light in color and clear . . . especially adaptable to top quality products.

It's absolutely uniform . . . The careful, scientific controls in making Armour's Animal Glue mean *complete* uniformity . . . help assure efficient, uninterrupted production in your plant.

Armour GLUE Division

MANUFACTURERS OF HIDE GLUE, BONE GLUE, FLEXIBLE GLUES, SOLUBLE DRIED BLOOD, BLOOD ALBUMIN

1355 WEST 31ST STREET • CHICAGO 9, ILLINOIS

...for better valve service!

DIRECT DELIVERY SERVICE

COMPLETE STOCK ROOM FACILITIES

AID IN SOLVING OPERATING AND MAINTENANCE PROBLEMS

ENGINEERING SERVICE

For production economy and efficiency, you must, of course, have good valves to begin with. That's why maintenance men prefer Lunkenheimer longer-life Valves . . . correctly engineered, quality built, dependable.

Yet in themselves even the best valves are not enough. A convenient source of supply and dependable service are equally important.

Lunkenheimer Distributors, located in principal industrial centers, render a *complete* valve service that saves time, trouble and money. Trained, qualified representatives are at your call to help with your valve problems.

For better, experienced valve service, call your nearest Lunkenheimer Distributor.

Fig. 2125 Bronze Gate

Fig. 1938 Steel Gate

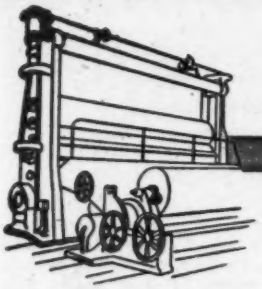
Fig. 1430 Iron Body Gate

THE LUNKENHEIMER CO.

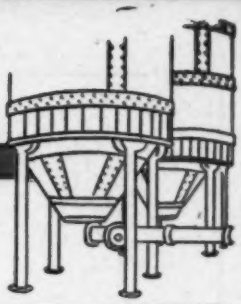
CINCINNATI 14, OHIO, U. S. A.

NEW YORK 13, CHICAGO 6, BOSTON 10, PHILADELPHIA 7. EXPORT DEPT., 318-322 HUDSON ST., NEW YORK 13

A COMPLETE LINE OF BRONZE, IRON, STEEL, and CORROSION RESISTANT ALLOY VALVES, 125 to 2500 LB. S.P.: BOILER MOUNTINGS, LUBRICATING DEVICES, AIRCRAFT FITTINGS



Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

Assembling Copper Tubes With Solder Fittings

Cut the tube to the length required with a hacksaw (32 teeth to the inch) or a disc cutter. Make certain that the tube ends are cut square. Special vises which hold the tube securely and guide the saw blade are furnished by a number of manufacturers (Figure 1)—Ream the tube and remove burr on the outside (Figure 2). Use a sizing tool if necessary to correct any possible distortion of the tube from handling. (Sizing tools larger than 2 inches are not available.) Connection should be carefully inspected before applying solder.

With steel wool (Figure 3) clean the outside surface and the end of the tube and the inside surface of the fitting until the metal is bright. All traces of discoloration must be removed. . . This must be done even though the tube may appear to be perfectly clean, and is particularly important when soldering larger size joints.

Apply a thin, uniform and complete coating of a reliable brand of soldering flux to the cleaned surfaces of the tube and fitting (Figure 4). After the tube has been inserted into the fitting as far as it will go, revolve the fitting once or twice to spread the flux uniformly (Figure 5).

Apply the flame of a gasoline or air-acetylene torch to the fitting; occasionally testing the heat by touching the fitting with solder (Figure 6). During the heating operation, adjacent wood surfaces should be protected from the heat by means of sheet asbestos. Because of its narrower, more concentrated flame, the air-acetylene torch can frequently be used closer to wood surfaces without scorching than would be possible with a gasoline torch.

When the fitting has reached the correct temperature to melt the solder, remove flame and apply solder to the edge of the fitting where it comes in contact with the tube (Figure 7). Be sure that enough solder is used. In general, this can be determined by making a bend or kink in the solder wire at a distance from the end corresponding to the diameter of the tube — ½ inch of solder for ½-in. tube, etc. (based on 1/8-in. solder wire). When the solder congeals to a plastic state, remove excess metal with a cloth or brush, leaving a fillet of solder in the chamfer at the end of the fitting.

When disconnecting a tube from a fitting on which other connections are to be left intact, the application of wet cloths to the parts which are not to be disturbed will prevent melting of the solder at such connections.

More than ordinary care should be exercised in soldering fittings 2½-in. and larger. It is essential that the heat should be uniformly distributed around the entire circumference of the fitting and not concentrated on one spot. When a Prest-O-Lite torch, or similar air-acetylene equipment is employed, a tip producing a wide flame should be used. The flame should be directed on the fitting to avoid any unnecessary annealing of the tube. For assembling lines, 3 inches and over, it may be necessary to use two or three torches. Solder should then be applied simultaneously at two or more points.—The American Brass Company.

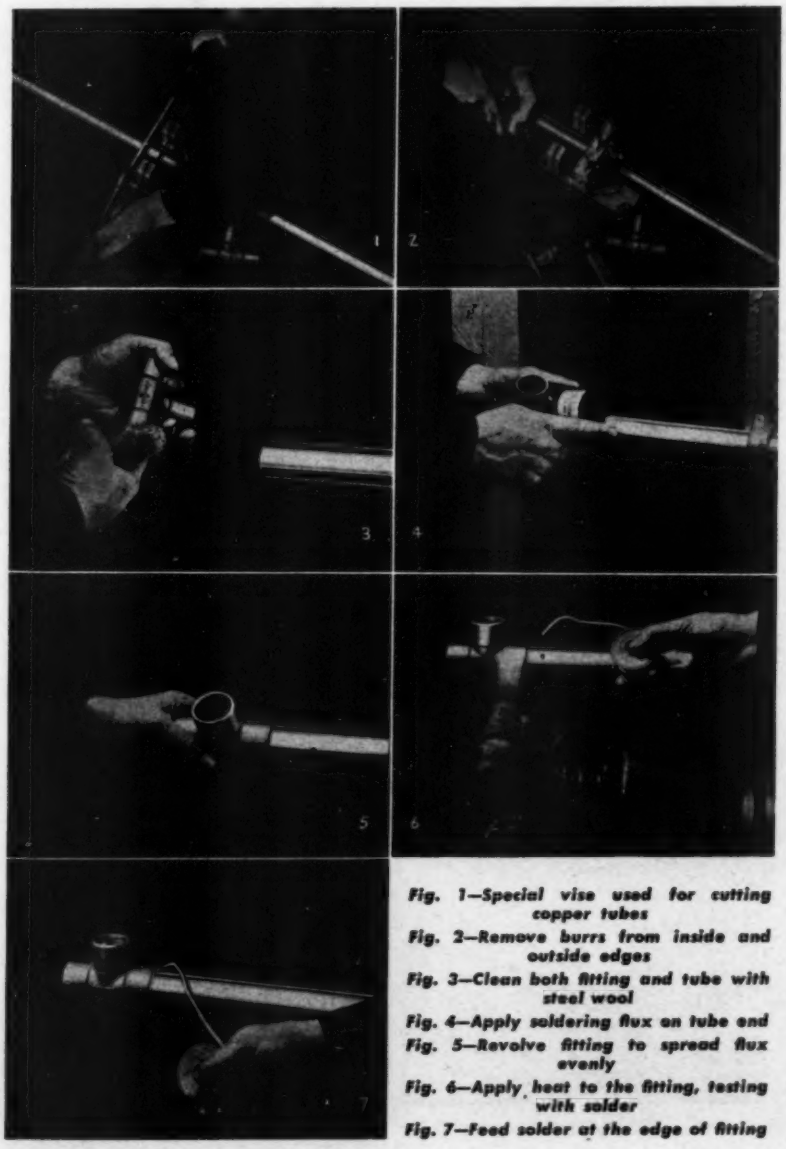


Fig. 1—Special vise used for cutting copper tubes

Fig. 2—Remove burrs from inside and outside edges

Fig. 3—Clean both fitting and tube with steel wool

Fig. 4—Apply soldering flux on tube end

Fig. 5—Revolve fitting to spread flux evenly

Fig. 6—Apply heat to the fitting, testing with solder

Fig. 7—Feed solder at the edge of fitting

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How Many Cylindrical Pieces in a Pile

To determine the number of rolls of paper or other cylindrical pieces in a pile that is arranged triangularly (Figure 1), it is necessary only to count the low-

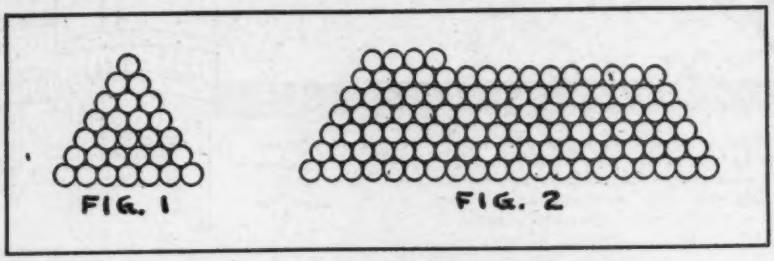


FIG. 1

FIG. 2

est layer. Then multiply that figure by a number that is one greater and divide the product by two. That gives the answer.

For example, there are seven pieces in the bottom layer of Fig. 1. Therefore, the total number of pieces in the pile equals $(7 \times 8) \div 2$ or 28.

In an arrangement like Figure 2, the procedure is slightly more complicated. Designating the lowest layer as A, the number of complete layers as B, and the number of pieces in the top incomplete layer as C, the formula for making the calculation is: Multiply A by 2; substract B; add 1; multiply by one-half of B; and add C.

Hence the total number of pieces in Figure 2 is calculated as follows: $20 \times 2 = 40$; $40 - 6 + 1 = 35$; $35 \times 3 = 105$; $105 + 4 = 109$. There are 109 pieces in the pile.—W. F. SCHAPHORST.

◆

Filing Hand Crosscut and Hand Rip Saw

The teeth of hand crosscut saws (Figure 1) do their cutting with their edges and points, consequently these edges must be beveled accurately and sharp. This saw is clamped in the holder with handle to the right, and the filer should begin at the point of the saw and work toward the handle. For filing these saws, the following files are recommended:

For saws with 5 to 7 points to the inch, the 6" or 7" slim taper.

For saws with 8 or 9 points to the inch, the 7" extra slim taper.

For saws with 10 or 11 points to the inch, 4" to 5½" extra slim tapers.

Place the file in the gullet to the left of the first tooth set away from you. Hold the file level with the angle of the saw blade, as indicated in Figure 3. At this angle it should touch evenly on the bevels of the two teeth, so that both sides of the gullet are filed with the same stroke. The file stroke must be kept level throughout the stroke. If jointing the teeth has left some flat tops, such teeth at this time should be filed only until half the flat top is cut away. Skip the next gullet and place the file at the same angle in the one following. Follow the same procedure until every other gullet has been filed.

Now reverse the saw and, beginning again at the point of the saw, place the file in the gullet to the right of the first tooth set away from you. (The saw is now held in the clamp so its point is toward the right.) File until the other half of the flat tops have been cut away, and continue, filing every other gullet, to the handle.

Filing the Hand Rip Saw

So far as jointing the tooth points and the choice of file are concerned, the same procedure is followed in filing a hand rip saw as in filing a hand crosscut. But it will be noted from the illustration (Figure 2) that the rip saw is filed so its tooth points, not its tooth edges, do the cutting. In this case the file is held level and at right angles to the side of the blade (Figure 4). Every other rip saw tooth is brought to a square edge; then the saw is removed and reversed, end for end, in the clamp, and the remaining teeth filed. —NICHOLSON FILE COMPANY.

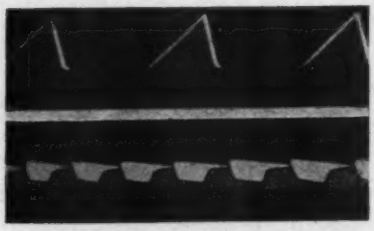


Fig. 1—Hand crosscut saw

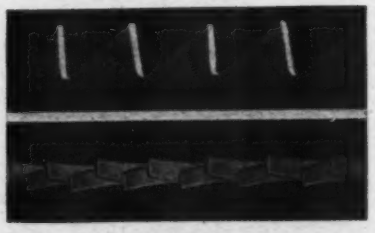


Fig. 2—Hand ripsaw

Figure 3

Figure 4

Templet for Making "Stove-Pipe" Bends

The accompanying sketches and illustrations *(see facing page)* show how an inexpensive templet for laying out so-called "stove-pipe" bends is made and used.

Fig. 1—This sketch shows construction details of a templet for making 90-deg., two-piece bends in 6-in. diam. pipe. Templets for other pipe sizes are made by increasing or decreasing the dimensions of the composition board sheets. For other angles of cut, make additional positioning plates as shown in the sketch below

Fig. 2—(Top) Parts of templet. (Bottom) The templet assembled. Dotted line shows position of telescoping sheets when the templet is in closed position

Fig. 3—This sketch shows the angles of the positioning plates for making four types of 90-deg. bends. Similar plates can be made for odd angles

Fig. 4—First step is to mark a center line on pipe, using a combination square and chalk line. The center line keeps pipe segments square with each other

Fig. 5—In making a 45-deg. angle, snug the templet to the pipe with the positioning plates lying flat on the pipe along the center line. Then tighten set screws

Fig. 6—With a helper holding the templet, the operator lays out the cut around the pipe by sliding a flat soapstone along the templet surface

Fig. 7—A pipe cross is made by swinging templet 180 degrees around pipe. Distance along center line between chalk lines should be diameter of pipe plus ⅛ in.

Briefly, the templet consists of two complementary pieces of flat composition board provided with cut-outs to fit over and snug the pipe. When closed, the cut-outs form a circle, the diameter of which is that of the pipe for which the templet is being made. When opened, the templet can be tilted and made to snug the pipe along any angle as determined by means of auxiliary positioning plates. The layout for the cut is made by chalking the pipe along the templet.—THE LINDE AIR PRODUCTS COMPANY.

◆

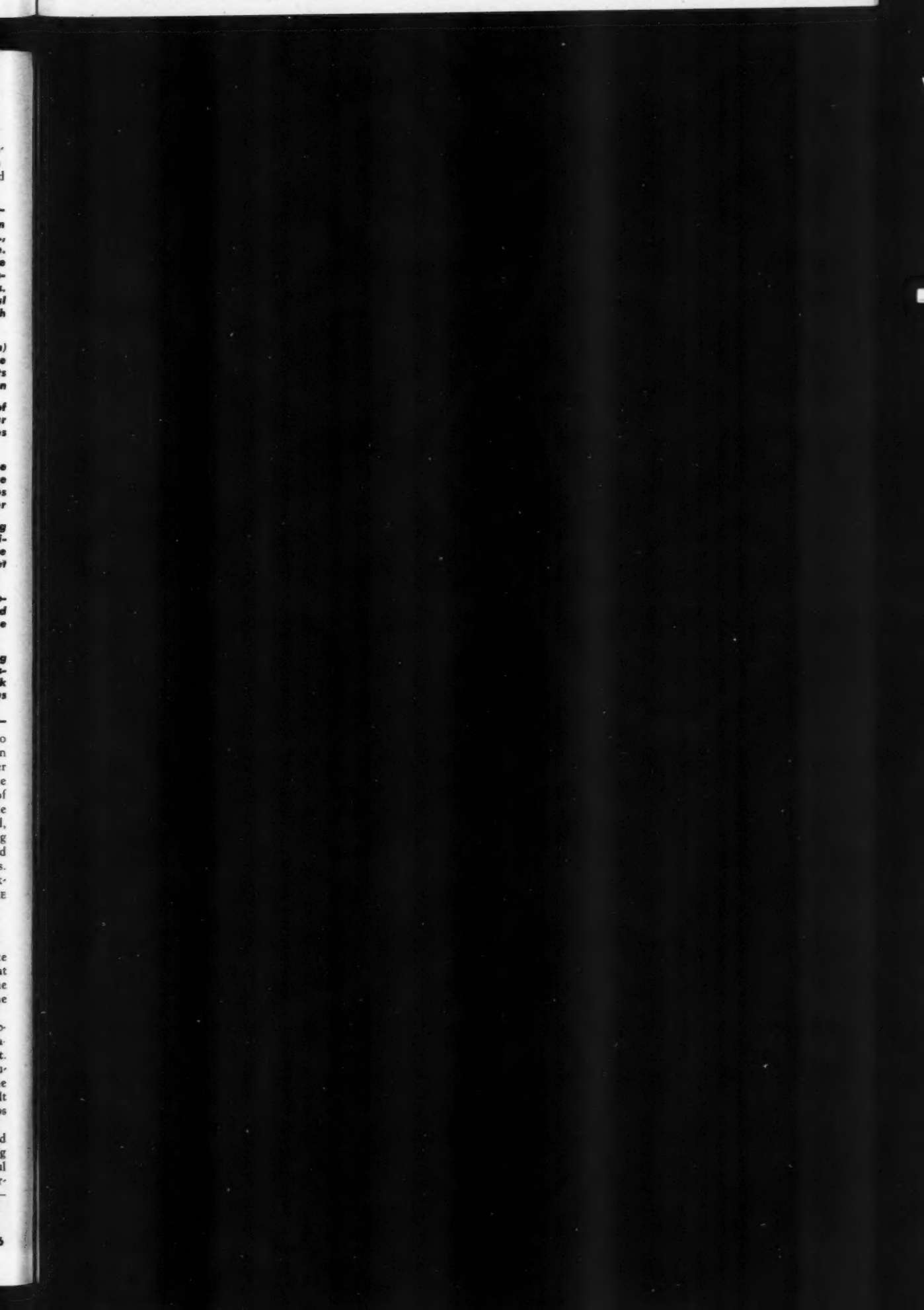
Elevator Belting Maintenance

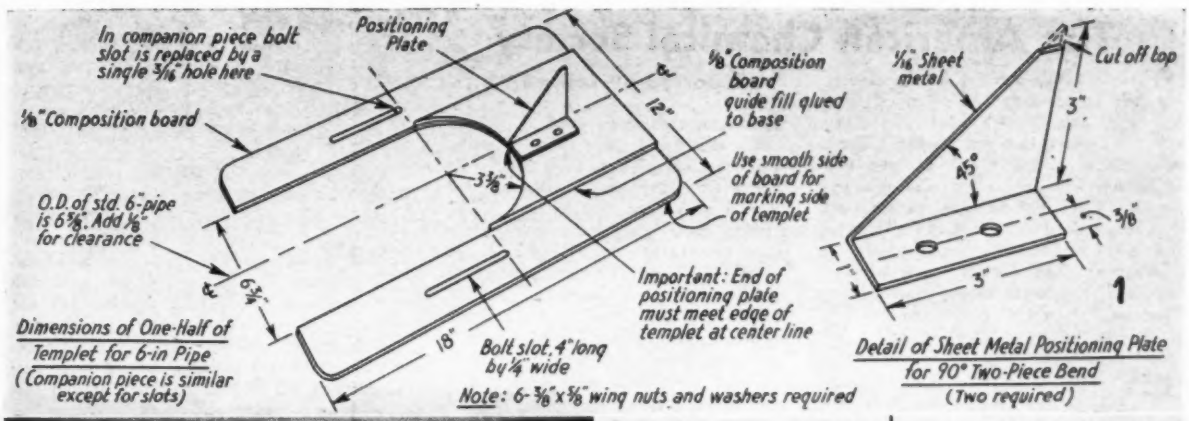
When splicing elevator belting, make sure to locate bolt holes carefully so that stresses are uniformly distributed over the entire width and between all plies of the belt.

Bolt holes should be dressed with rubber cement or shellac to prevent penetration of moisture into the plies of the belt.

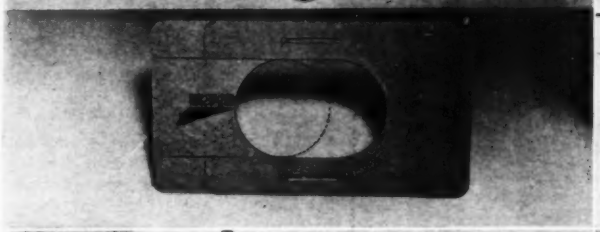
Where waste material tends to accumulate behind the buckets or where the buckets cause excessive wear on the belt surface, the installation of bucket scabs is recommended.

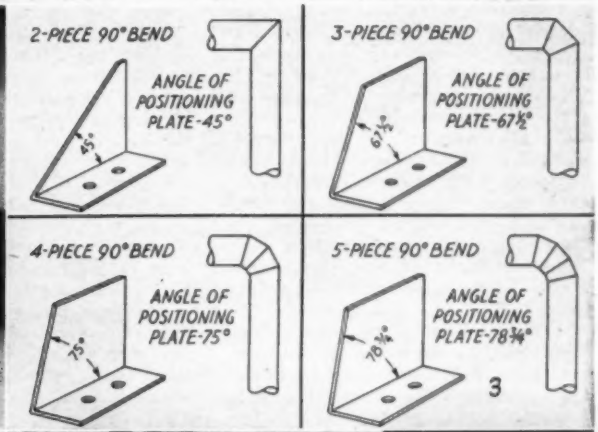
The use of bucket scabs is recommended both to cushion belts against loading shock and to guard against harmful abrasion caused by spilled materials entering between the belt and bucket.—HEWITT-ROBINS, INC.

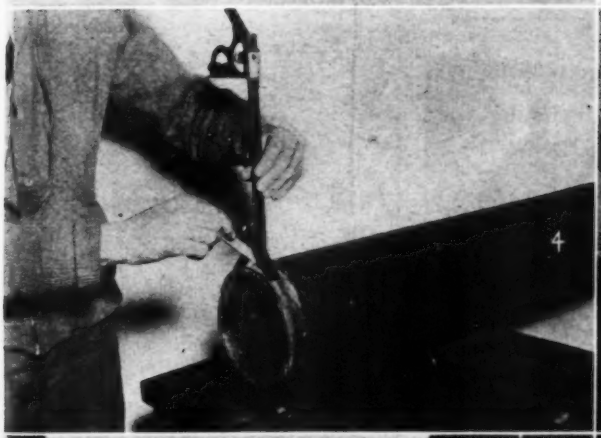



In companion piece bolt slot is replaced by a single 3/16" hole here
Positioning Plate
1/8" Composition board
12"
1/8" Composition board guide fill glued to base
Use smooth side of board for marking side of templet
3 3/8"
O.D. of std. 6" pipe is 6 5/8". Add 1/8" for clearance
6 3/4"
18"
Bolt slot, 4" long by 1/4" wide
Important: End of positioning plate must meet edge of templet at center line
Dimensions of One-Half of Templet for 6-in Pipe
(Companion piece is similar except for slots)
Note: 6-3/8" x 5/8" wing nuts and washers required
1/16" Sheet metal
Cut off top
3"
45°
3/8"
3"
1
Detail of Sheet Metal Positioning Plate for 90° Two-Piece Bend
(Two required)

2




2-PIECE 90° BEND
ANGLE OF POSITIONING PLATE-45°
45°
3-PIECE 90° BEND
ANGLE OF POSITIONING PLATE-67½°
67½°
4-PIECE 90° BEND
ANGLE OF POSITIONING PLATE-75°
75°
5-PIECE 90° BEND
ANGLE OF POSITIONING PLATE-78¾°
78¾°
3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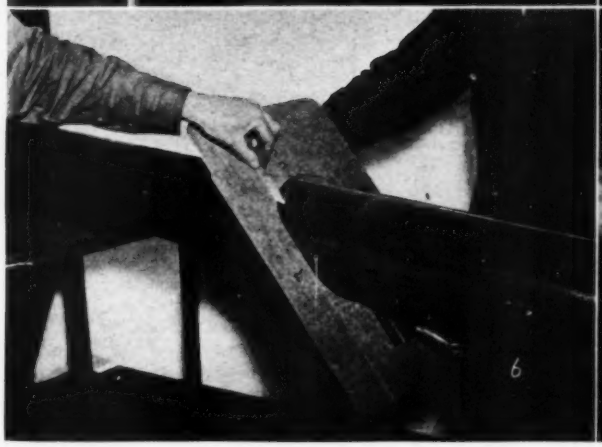
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The American Chemical Society

(Reported by Louis E. Wise)

▶▶▶ The 110th meeting of the Society was held in Chicago and extended from September 9th through 13th. In many ways, this convention was unique. There were several symposia and at least two celebrations in honor of distinguished chemists. Over 700 technical papers were read before the 17 divisions of the Society, and well over 8,000 chemists were in attendance. The meetings were held in various of the larger hotels—the Stevens, Sherman, Palmer House (the headquarters of the convention), Morrison and Congress—as well as in the Coliseum. The Fourth National Chemical Exposition (also held at the Coliseum) and the United Nations Educational Scientific and Cultural Organization ("UNESCO") lent even greater interest and importance to the technical aspects of the meeting.

Naturally, no attempt can be made to give a complete survey of such a convention. Brief abstracts of the technical papers alone fill a volume of several hundred pages. Any report must confine itself to certain highlights, and even these must be treated with the greatest brevity. Those papers which appear to have some connection (direct or remote) with the cellulose or paper industries will be mentioned.

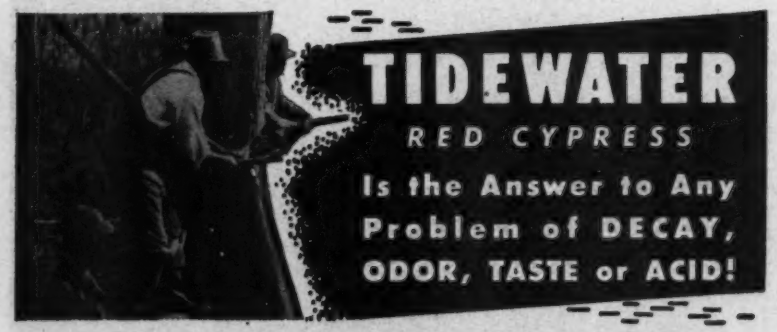
In the *Division of Agricultural and Food Chemistry* there was an extensive symposium on "browning" of foodstuffs. This browning was concomitant with deterioration which was especially marked in dehydrated foods used by the Army and which was perhaps most serious in the Pacific area. Thus the Quartermaster Corps sponsored a program of fundamental research on the subject. Evidently certain sugars give rise to colored products. Furthermore, they engender the so-called "melanoidin" reaction which is of primary interest in discolored foods. Research chemists from the Corn Products Refining Company, General Foods Corporation, Bureau of Agricultural and Industrial Chemistry, the "brewing" companies, the New York Sugar Trade Laboratory, Colorado State College of Agriculture and Mechanics, Michigan State College, and Interchemical Corporation discussed these undesirable complex reactions at some length, and some of the chemists outlined methods for controlling the darkening of foodstuffs. The subject is mentioned here because the proper packaging of foodstuffs was a major problem of the pulp and paper industry during the war. Furthermore, a study of the "browning reactions" may throw some light on the obscure colorations taking place in certain pulping operations.

The Division of Cellulose Chemistry included some exceedingly interesting and important papers. Of these, four emanated from the laboratories of the Eastman Kodak Company at Rochester, New York. Dr. Kenyon and his many co-workers have shown that when cellulose is oxidized by nitrogen dioxide, it forms a fibrous "celluronic" acid and this in turn forms salts. This material is proving of great interest in surgical dressings in that it is hemostatic and is absorbed completely by the animal body. However, the papers presented did not discuss the industrial aspects of this celluronic acid. They took up the purely scientific (analytical and structural) studies of the product and also discussed the mechanism by which it is formed from cellulose. The first two papers were presented by Dr. W. F. Fowler, Jr.; the other two were given by Dr. C. C. Unruh. Dr. Heuser and his colleagues, Mr. Shockley and Miss Adams, described a new method for the preparation of cellulose acetate. Strong phosphoric acid dissolves cellulose, which may then be acetylated with acetic anhydride. However, there is some degradation, the degree of polymerization ranging from 100-530. The densities of cellulose esters were determined by scientists of the Eastman Kodak Company, and a report was given by Malm, Genung and Fleckenstein. The esters (i. e., the acetates, acetate-propionates, and acetate-butyrates) were measured by the Archimedes and flotation methods and were also calculated from unit molecular weights and unit molecular volumes. Observed and calculated values agree well. In determining densities it was essential to select media which did not cause swelling or solution of the samples. The Experiment Station of the Hercules Powder Company reported on the degree of substitution of sodium carboxymethyl cellulose, and described several methods for this determination.

A diffusion study of lignosulphonic acids in sulphite waste liquor was made by Drs. Pennington and Ritter of the University of Washington (Seattle). By using experimentally determined average integral diffusion coefficients for methoxyl transfer, the authors calculated the molecular weights of the lignin derivatives. About 60 per cent of these compounds had molecular weights of 10,000 or more. Only a small fraction had molecular weights as low as 3,000.

A method for determining alumina in wet rosin size precipitate "floc" was developed by Dr. Price of the Hercules Powder Company (Wilmington). Standardized size precipitates contained no significant amount of alumina. The aluminum ion (rather than alumina) was required in the formation of an effective rosin size precipitate. Any excess of alkali introduced into the system reacted with alum to yield alumina which then coprecipitated with the rosin size.

Using the electron microscope, Kinsinger and Hock (also of the Hercules Powder Company) made studies on natural cellulose fibers. Three recent developments in preparing samples for electron microscopy were used, (1) metallic shadow casting, (2) surface replica, and (3) electron stains. A periodic structure of 150 Angstrom units along the fibril axis was detected, but its significance is not yet clear. The scientists of the Southern Regional Laboratory (New Orleans) reported on a calorimetric investigation of moisture in



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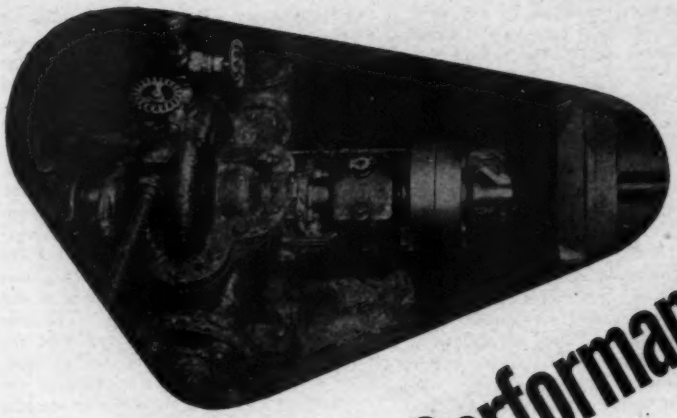

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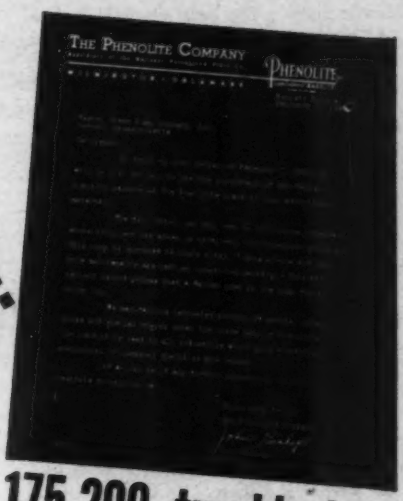

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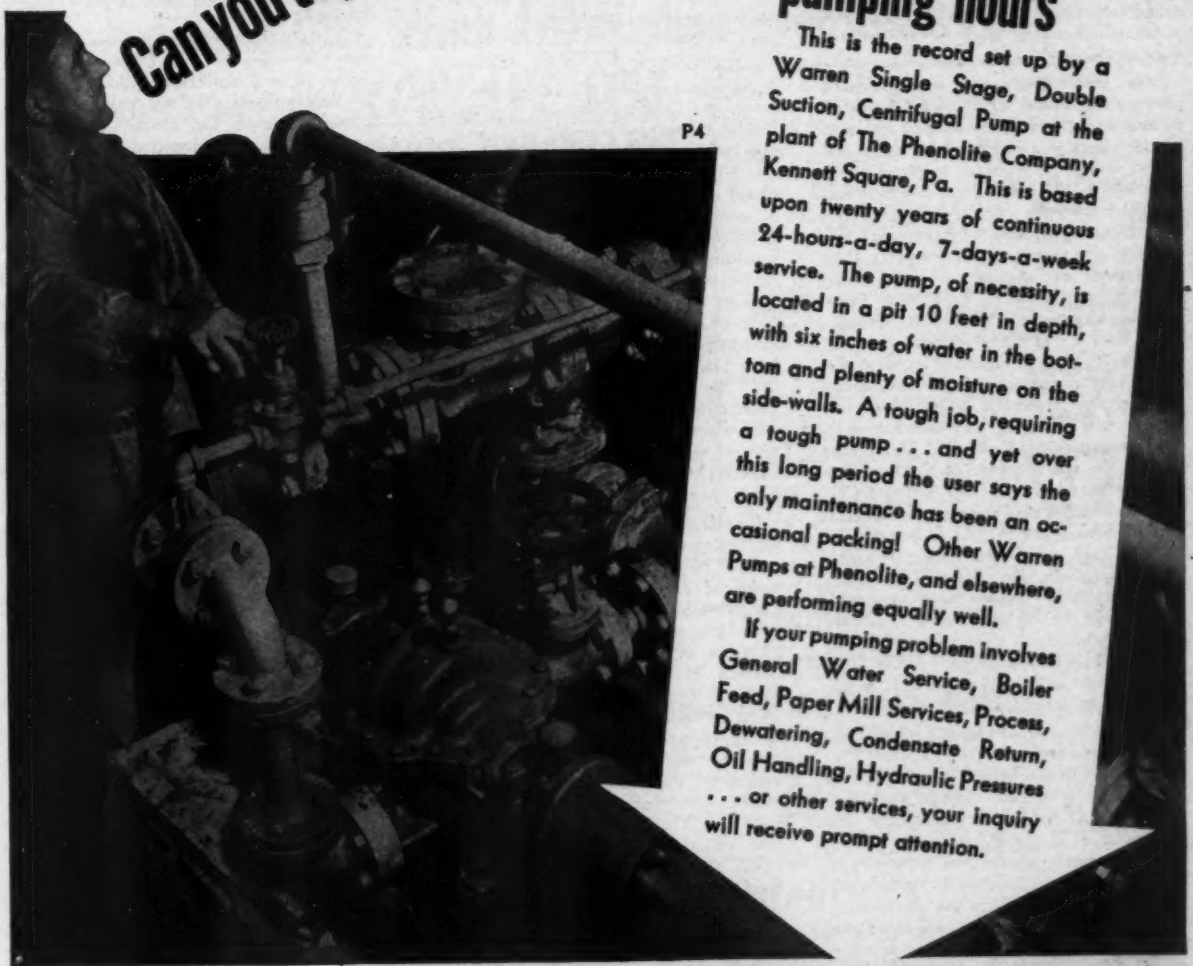

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textile fibers. The same group described the experiments on a comparison of the elastic properties of some tire cords, measurements of which were reported for cotton, mercerized cotton, rayon, and nylon under several conditions of moisture and temperature. Whereas stretched cotton and mercerized cotton cords were relatively unaffected by change in temperature and moisture condition, unstretched cotton, rayon and nylon showed appreciable changes as moisture was added to the dry cord and the changes were accentuated with increasing temperature. Elastic moduli of cotton remained steady or increased with moisture and temperature, whereas moduli of rayons and nylons decreased under these conditions.

The Division of Chemical Education held a symposium on chemical patents which included six papers in the field. The same division sponsored a symposium on *Technical Library Techniques* which included ten papers. A feature of this symposium was the application of punched-card methods to various chemical problems. One paper included a round table discussion at which librarians, industrial chemists, teachers, and editors were represented.

Many interesting papers were presented before the *Division of Colloid Chemistry*. Among them may be mentioned a report on the effect of electrolytes on the foaming capacity of soybean protein dispersions by J. M. Perri, Jr., and F. Hazel of the University of Pennsylvania, and the colloidal properties of quaternary ammonium compounds which influence their effectiveness as fungicides, by Mack and Hamilton of the New York State Agricultural Experiment Station at Geneva, New York. Pathways for the diffusion of water vapors through textiles were discussed by L. Fourt and M. Harris. Among other papers presented before this same division, the following may be mentioned: The Properties of Plant Cell Membranes Related To the Presence of Calcium Pectate (by Wanda Farr of the Celanese Corporation) and The Dimensional Stabilization of Wood (by Alfred J. Stamm and Harold Tarkow of the Forest Products Laboatory). In Dr. Stamm's paper, a new acetylation process was presented, which gives the highest degree of dimensional stabilization thus far obtained. Here the stabilization appears due to bulking effect as well as the chemical reduction of hygroscopicity.

The Division of Industrial and Engineering Chemistry held its 11th *Unit Process Symposium* at which ten interesting papers were presented. It also sponsored a symposium on the construction and equipment of research laboratories—ranging from small laboratories to those intended for great industrial enterprises. *High pressure technology* was discussed in a series of nine papers, and there was a widespread symposium on the chemistry of that hyper-active element—fluorine—which is now of the utmost industrial significance. This symposium (the greatest of the meet) included 32 distinct papers. Among others, the properties of a hydrogen-fluorine torch were discussed. Its bluish-white flame gives perhaps the most intense heat ever developed by any welding torch. It welds or cuts copper, nickel, steel, and monel metals—but cannot weld aluminum.

As usual, the *Division of Organic Chemistry* presented a great number of papers (a total of 79). Of these only a very few need be mentioned here. The resin acids (so important in sizing paper) and the determination of their structures were discussed by G. C. Harris of the Hercules Experiment Station. A paper on Vanillin And Its Derived Compounds was presented by Irwin A. Pearl (The Institute of Paper Chemistry). Vanillin, now made on a large scale from sulphite waste liquor, may be converted to vanillic acid almost quantitatively by fusing with caustic potash at temperatures below 240° C. Above this temperature protocatechuic acid is formed. Vanillic acid and its esters are of marked commercial interest. The oxidation potentials of some compounds related to vanillin were treated by D. M. Ritter (Pulp Mills Research Project of the University of Washington). The reaction of p-cymene (a by-product of sulphite pulping) with olefinic hydrocarbons was described by Ipatieff and Pines of Northwestern University (Evanston).

At least four (of the 16) papers given before the *Division of Paint, Varnish and Plastic Chemistry* may be of interest to the cellulose industrialists. Malm, Salo, and Vivian (of the Eastman Kodak Company) described the melt coating properties of compositions containing high butyryl cellulose-acetate-butyrates. The effect of humidity on the physical properties of plasticized ethyl cellulose was discussed by Moeller and Taylor (of the Celanese Corporation). Some factors affecting the low-temperature impact strength of cellulosic plastics were outlined by Gloor of the Hercules Powder Company. Sulphonamide plasticizers and their use in conjunction with cellulose acetate and nitrate were discussed by Bergen and Craver (Monsanto Chemical Company, St. Louis, Missouri).

The Division of Physical and Inorganic Chemistry sponsored an important forum on high polymers involving some 24 papers —several of them dealing with cellulose. For example, Hofrichter and McLaren discussed the temperature dependence of the adhesion of high polymers to cellulose; Saeman, Harris and Kline (of the Forest Products Laboratory) discussed the kinetics of cellulose hydrolysis. Finely divided wood and wood pulp hydrolyzed at nearly the same rate under all conditions studied and both wood and wood pulp hydrolyzed more than twice as fast as did cotton. This large difference in the rate of hydrolysis was an index of a fundamental difference in the nature of wood and wood pulp hydrolyzed at nearly the same rate under all conditions lysis, the cellulose is completely degraded to "hydro-cellulose" before significant hydrolysis to glucose occurs. Insoluble hydrocellulose is converted to soluble polysaccharides following the laws of a first order reaction. The water soluble polysaccharides are converted to glucose, which finally suffers decomposition. The "creep" of textile viscose rayon was studied by O'Shaughnessey (Polytechnic Institute of Brooklyn). This same division sponsored a comprehensive symposium on proteins and other large molecules in the solid state.

One of the high spots of the entire meeting was the so-called "Hudson Celebration" which was an extensive symposium on the achievements of Prof. Claude S. Hudson of the National Institute of Health and his eminent collaborators. Dr. Hudson, at 65, is one of the great chemists of our time, and this was a fitting tribute to his contribution in the field of carbohydrate chemistry. The symposium, while stressing the impact of the Hudson school on industry, the universities and on human welfare, gradually developed into an over-all review of current progress in carbohydrate chemistry. Needless to say, the 42 papers cannot all be mentioned in a brief resumé. Dr. Hockett (Chairman), Dr. Purves (of McGill University) and Dr. Moyer (of the A. E. Staley Manufacturing Company) all eulogized Dr. Hudson. The latter and his co-workers presented several highly technical papers.

An illustrious visitor at this meeting was Dr. Walter N. Haworth, Nobel prizeman, and professor at the University of Birmingham. He not only served as commentator on Dr. Hudson's important contributions, but presented a paper on a somatic polysaccharide at the symposium. Another distinguished visitor from England was Dr. G. F. Davidson, of the Shirley Institute at Manchester. Dr. Davidson gave a comprehensive review on recent advances in the study of the oxycelluloses, referring also to the importance of Hudson's (as well as Kenyon's) researches in this field. The chromatographic separation of sugar derivatives was treated in an entire series of papers. Recent applications in this intriguing field were discussed by Dr. Coleman (Iowa State University), and other papers on this same general subject emanated from Iowa State College, Northwestern University, and Ohio State University. Hemicelluloses of various pulpwoods and their analytical study were discussed by L. E. Wise (The Institute of Paper Chemistry), who also sought to delimit the term "alpha cellulose." Current advances in the chemistry of the pectins were discussed by McClay, Owens and McCready (of the Western Regional Research Laboratory), and the extraction of pectin from sugar beet pulp formed the subject of a paper by Miss Robox and Dr. Van Hook of the University of Wyoming. Prof. W. Z. Hassid (of the University of California) showed how certain disaccharides could be synthesized by means of enzymes. There was also an important paper on the analysis of the structure of starch by means of phosphorylase by Miss Swanson and Prof. Carl F. Cori, of Washington University School of Medicine (in St. Louis). Essential steps in the mechanism of wood decay by the action of molds was reported by Drs. Nord and Vitucci of Fordham University. The path of the decay is as follows: wood cellulose——→glucose——→ alcohol——→acetic acid——→oxalic acid. Intermediate steps are also discussed. The fermentation of wood hydrolyzates by

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That is the perfectly natural reason why you have always noticed that the sidewall of the *ordinary* V-Belt is the part that wears out first. Clearly, anything that lengthens the life of the sidewall will lengthen the life of the belt.

The simple diagrams on the right show clearly why the ordinary, *straight-sided* V-Belt gets excessive wear along the *middle* of the *sides*. They show also why the Patented Concave Side *greatly reduces* sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

Straight Sided V-Belt — FIG. 1

How Straight Sided V-Belt Bulges When Bending Around Its Pulley — FIG. 1A

You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Gates V-Belt with Patented Concave Sidewall — FIG. 2

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley — FIG. 2A

No Bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

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Torula utilis (yeast) was reported by Harris and Marquardt, and Hanna and Bubl of the Forest Products Laboratory. This yeast, under proper conditions, was able to utilize 90-95 per cent of the reducing sugars of the wood. For example, the yield of alcohol from a Douglas fir wood hydrolyzate (containing 5 per cent reducing sugar) gave 20 to 21.4 grams of alcohol per liter. *Torula utilis* (utilizable as fodder yeast) can be cultured on such wood hydrolyzates, and gave yields representing 50-60 per cent of the sugar originally present. The protein content was 42-48 per cent of the dried yeast.

The production of lactic acid by fermentation of sulphite waste liquor was discussed by Drs. Leonard and Peterson, of the University of Wisconsin. Two thousand gallons of the liquor (corresponding to about a ton of spruce sulphite pulp) would yield 285 pounds of lactic acid and 75 pounds of acetic acid. The original liquor was steam stripped, and the sulphite precipitated at pH 8.5. This was followed by filtration, neutralization with carbon dioxide and inoculation with *lactobacillus pentosus* "124-2," which in the presence of suitable nutrients gave rise to the acid products, the pH of the medium being controlled by addition of calcium carbonate.

The foregoing report is merely a sketch outlining a very few of the topics discussed at this collosal meeting. It does not include a description of the breakfasts, luncheons, mixers, social hours, or dinners. It says nothing of the various "medallists" honored by the Society. The meeting as a whole was a marked success, and the papers, in general, were of very high caliber.

Convention Papers . . . Abridged

Abridgments in this section are from papers presented at the fall meeting of *The Technical Association of the Pulp and Paper Industry* held in Detroit, Mich., September 26-28, 1946.

Southern Forests as a Source of Pulpwood

JAMES W. CRUIKSHANK, Chief
Division of Forest Economics
Southeastern Forest Experiment Station

The South, as discussed here, includes the coastal states extending from the Potomac south to Florida and west to the plains of Texas, plus the inland states of Tennessee, Arkansas, and Oklahoma. Within its boundaries lie almost the entire commercial range of the southern yellow pines and a large part of the nation's supply of hardwoods. It contains 183 million acres, or 40 per cent, of the commercial forest land in the United States and 1.9 billion cords, or 28 per cent, of the timber. Practically all is easily accessible by water, rail, or good roads. Even more important from the long-range view, its soils and climate favor rapid timber growth, and year-round logging seasons facilitate timber harvesting.

Bordering the Atlantic and Gulf coasts from South Carolina to east Texas is the longleaf-slash pine forest of the flat coastal plain, the source of all our gum naval stores. Altogether it covers nearly 35 million acres, two-thirds of which are in Florida and south Georgia. In the Carolinas and Virginia, the loblolly pine is the leading species of the coastal plain with shortleaf pine the dominant tree farther inland on the Piedmont. The scrubby and short-lived Virginia pine spreads across all three states in the foothills of the Appalachians and on into north Georgia and Alabama. The separation between loblolly and shortleaf pine is less distinct in the deep South; and the rolling hills of Georgia, Alabama, Mississippi, Louisiana, and Texas are clothed with a mixed loblolly-shortleaf-hardwood forest. Southwestern Arkansas runs heavily to loblolly pine in mixture with hardwoods, but in the mountainous section of the state loblolly is replaced by shortleaf. Tennessee is chiefly a hardwood state, although scattered shortleaf pine is found in the Tennessee Valley, and a narrow belt extends along the western edge of the Appalachians into Kentucky. Altogether, there are nearly 70 million acres of this loblolly-shortleaf-hardwood forest in the region. Other forests, somewhat less important from a pulpwood standpoint, are the appalachian hardwoods of western North Carolina, Virginia, and north Georgia, the scattered stands of upland hardwoods that break up the continuity of the pine timberlands, the bottomland hardwoods that occur along all of the major rivers, and the broad expanse of Delta hardwoods that occupy the Mississippi flood plain.

When we think of Southern forests, we are almost sure to think of the pines for which it has been famous since earliest colonial times, so it may be somewhat of a surprise to learn that of a total stand of 1.9 billion cords, over 55 per cent is hardwood. Softwoods, chiefly the several southern yellow pines, total about 833 million cords. The preponderance of hardwoods is primarily in the smaller tree sizes; hardwood saw timber totals only 144 billion board feet compared to 194 billion feet of pine.

Compared to an annual pulpwood requirement of about 8 million cords, timber volumes appear very reassuring, apparently indicating a considerable supply of timber for the present and for some time to come. However, pulpwood accounts for only 10 per cent of the total cut, and pulpwood producers must compete with other industries for wood. Also, even though 55 per cent of the wood in the South is in hardwood species, less than one-tenth of the pulpwood is cut from hardwoods. Major changes in pulping processes, plant equipment, final product, and wood procurement practices will be necessary before hardwoods enter strongly into the supply picture.

For the South as a whole, the annual growth totals approximately 50 million cords of softwoods and 44 million cords of hardwoods. Thus, we are growing about one-half cord per average acre per year, but only one-quarter of a cord of the desired softwoods. This is much less than the land is capable of producing, and is also much less than we need if the South is to contribute its share of the wood requirements of a prosperous nation. There is every reason to believe that a major part of the pine land in the South can grow a cord of wood per acre per year. This can eventually be accomplished, but, even with an aggressive forestry program, it will take a number of decades to achieve if we continue at the same time to meet the needs of the forest industries.

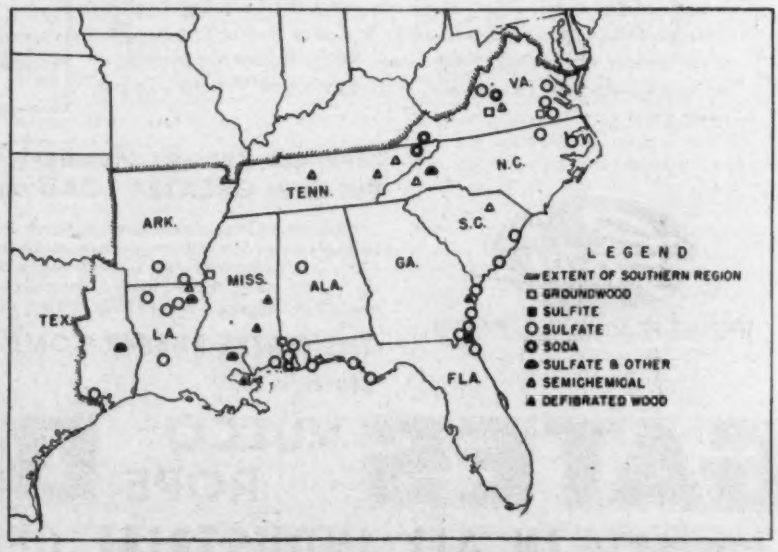

Fig. 2—Distribution and type of pulp mills in the South, 1946

What to Expect in Bleaching Gumwood Sulfate Pulp

Do you know what shade of brightness can be attained using a single stage hypochlorite procedure on gumwood sulfate pulp? To what extent can brightness be increased without loss of strength by using two stage chlorination hypochlorite procedures? What effect on brightness and strength does the introduction of a hot caustic extraction stage have? What is the relation between chlorine consumed and brightness in various types of chlorine hypochlorite procedures?

The answers to these questions are of interest to all who work or plan to work with gumwood sulfate pulps. They were found by Hooker's Technical Staff in a special bleaching study recently made. The results of this investigation have been published in Hooker Bulletin 241, Bleaching Gumwood Sulfate Pulp. It explains clearly the studies conducted, and the results. Tables and curves are liberally used and give graphically, valuable data of interest to you. Among the curves are the following:

1. *Relation of Brightness to Available Chlorine Added in Single Stage Hypochlorite Bleaching of Several Sulfate Pulps.*
2. *Relation of Chlorine Consumed to Brightness Developed when Using Various Procedures.*
3. *Strength and Freeness of Pulps Bleached by Three Kinds of Single Stage Procedure.*
4. *Strength and Freeness of Pulps Bleached by Two Kinds of Two Stage Procedure.*

We can hit only the high spots of the contents of this Bulletin here, but from these you can see that it will be a valuable addition to your file of literature on bleaching pulps. We shall be glad to send you a copy without charge when requested on your business letterhead.

Hooker's Technical Staff, working with pulp and paper makers for years has helped to set up the high quality standards for Hooker chemicals. You can depend on Hooker Chlorine, Caustic Soda and the other pulp and paper chemicals being of the high purity your work demands.

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One of the major problems to be solved before we can make substantial progress toward increasing the annual yield of wood is to control timber losses from such destructive agencies as fire, insects, and disease. Such losses now amount to 13 million cords annually—60 per cent more than the entire cut of pulpwood. Fire is the most important casual agency, and the one most susceptible to control. Forest insects and tree diseases take a toll of both softwoods and hardwoods, but widespread outbreaks are rare. At present, the greatest threat to the softwoods, aside from fire, is the so-called "little-leaf disease" of the shortleaf pine. Already hundreds of thousands of cords of timber have died, and the mortality rate continues unchecked despite the efforts of skilled pathologists seeking the cause and cure. Our objective should be to reduce these fire, insects, and dease losses as rapidly and completely as possible, and use the wood to satisfy the needs of southern people and industries. In 1944 the total amount of wood cut from southern forests amounted to about 46 million cords of softwoods and 36 million cords of hardwoods, distributed by commodities shown in Table 1.

Pulpwood procurement men know that theirs is a job which is becoming increasingly difficult. Some can think back 10 years when yellow pine stumpage sold for 75 cents a cord, and pulpwood delivered to the mill cost $4. Stumpage now averages about $2.25 and the OPA pulpwood price ceiling applicable to most parts of the South is $9.00. Ten years ago, 15 miles was considered the longest distance over which it was practical to truck pulpwood. Today, 15 miles is just an average haul. Why have these changes occurred?

Table 1—Distribution of commodity drain the South, 1944

Commodity	Total Per cent	Softwoods Per cent	Hardwoods Per cent
Lumber	51	55	46
Fuelwood	21	18	24
Pulpwood	10	17	2
Hewn ties	6	4	7
Veneer	3	1	7
All Other	9	5	14
Total	100	100	100

The immediate answer, of course, is competition. In 1936, there were only 30 pulp mills in the South. Wood fiber production totaled only 1½ million tons. Since that time, 21 new plants have been added, and most of the original ones have expanded. Production this year is expected to exceed 4¾ million tons. In other words, your industry has increased its output, and presumably its wood requirements, by 320 per cent in ten years. Reference to a map (Figure 2) showing pulp mill locations discloses another cause of intensified competition for wood within the industry. It is the tendency to concentrate plant construction in certain localities favored for their supplies of good water and power, nearness to chemical centers, or availability of barge transportation. There are, for example, six wood pulp mills within 65 miles of Mobile, five in the Jacksonville area, and five east or south of Richmond. Along the Arkansas-Louisiana line are seven more, somewhat less closely grouped. Of 12 to 14 new sites proposed, about half either fall in areas already crowded or will create similar problem areas elsewhere. Thus, although some pulpwood is cut in nearly every county of the South, the demand is, and will remain, particularly intense in a few localities. In most cases, it is aggravated by serious over-cutting and consequent reduction of timber stocks.

Of increasingly greater importance is the competition of other forest products industries. Foremost is lumber, which comprises 50 per cent of all the drain on the forest resource. Theoretically, pulp and lumber should complement each other, the former preferring trees 8 to 12 inches in diameter or below desirable sawlog size. In recent years, however, this balance has been disturbed. Saw timber is becoming increasingly scarce. Except for periods of business depression, over-cutting has continued year after year since the first decade of the century. During the past 10 years alone, the volume of the average pine saw-timber tree has been reduced 25 per cent in central Mississippi, 20 per cent in southwest Georgia, and 35 per cent in central Georgia and northeast Florida. At present, few sizable stands of large timber remain, and portable sawmills moving from one small tract to another account for most of the production. As available tracts become smaller and more scattered, and as the average tree size is reduced, the distinction between saw timber and cordwood is gradually losing significance. With a boom market for all types of construction lumber (including low-grade 2x4's), lumbermen are contracting, in some cases, for yellow pine timber to a six-inch minimum diameter. At prevailing saw-timber prices, this is competition which pulpwood men are unable to meet. Others offering competition in some localities are the producers of small poles, excelsior, and staves for nail kegs.

The present brisk demand for all forest products may persist five more years or even ten. While it lasts, there will be stiff competition for wood between your and other wood-using industries. Indeed, should the lumber market hold up another ten years, the small operators may take an appreciable share of the better quality timber stands you expect to draw upon. Within the pulp and paper industry, competition for wood will be intensified by expansion of existing plant facilities and by new construction.

This problem of gradually-tightening competition for a raw material that steadily shrinks both in volume and quality should be a vital concern to all of you with interests in the South. You represent an industry with a large fixed investment in plants. Unlike the small sawmill operator, it cannot afford to pick up those plants and move to fresh territory. Furthermore, the continued success of your industry hinges upon maintaining the advantage of low pulpwood and manufacturing costs it now enjoys over other producing regions. And it is fortunate for the South that this is so, for you and your industry are in a position to take the lead, not only in solving your own wood procurement problems, but in attacking the forest problems of the region.

Your plan of attack might logically include three phases: (1) intensified research, chemical and economic, in the utilization of wood material not now in general demand; (2) forest land acquisition; and (3) a highly organized region-wide program to promote better cutting practices and forest protection, and to increase the productivity of forest land.

The first phase—intensified research in the economic and technical aspects of utilizing hardwoods, cull trees, and logging and manufacturing waste—would be a step toward assuring yourselves an ample supply of raw material at a price little affected by competition. There is, for instance, nearly two million cords per year excess of hardwood growth over drain, mostly in trees of convenient size for pulping. Also available are 300 million cords of sound material in hardwood cull trees.

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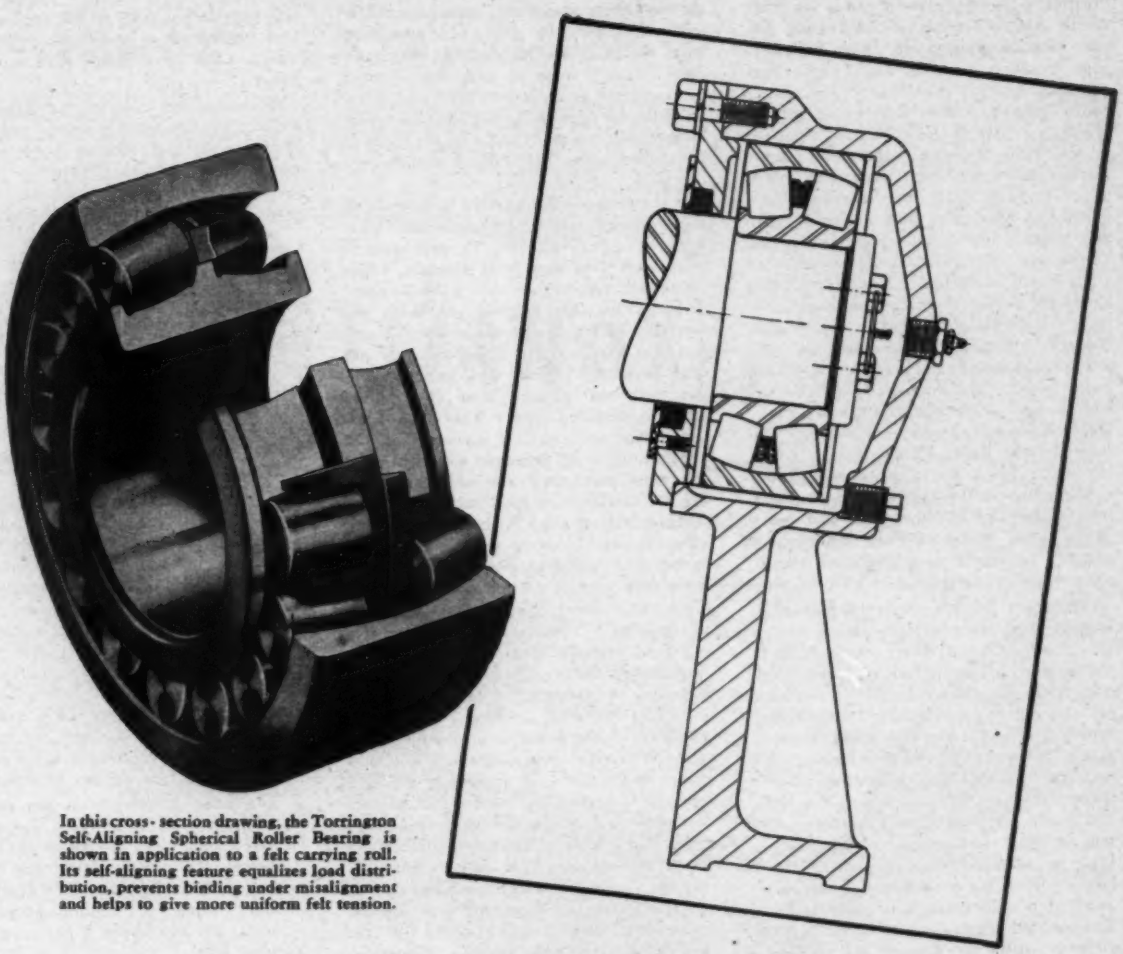

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Practically its only present use is for fuel. About 950,000 cords of hardwoods per year are now pulped for use in high-tonnage products such as kraft paper and paperboard, in hardboard, insulation board, roofing, and in finer grade papers. Nearly 400,000 of this is in dead chestnut in the form of spent chips from tannin extract plants, but some kraft mills introduce as much as 10 per cent of "live" hardwood fiber into high-strength paper and board. Other mills have abandoned hardwoods after unfortunate experiences with poorly controlled ratios of pine and hardwood pulps or with promiscuous mixtures of hardwood species. The greater cost of cutting and processing has been a further handicap. However, hardwood pulps tend to give improved surface, formation, and other properties often desirable in corrugating and liner boards. The International Paper Company now has a hardwood plant for this purpose under construction at Georgetown, South Carolina. Company foresters hope that much of the wood will come from improvement cuttings in mixed pine-hardwood stands, thereby increasing the future yield of pine.

The other possible source of pulpwood—logging and manufacturing waste—is in many respects the most promising. In the South, each cubic foot of forest products ready for the consumer or re-manufacturer represents 1.6 cubic feet of sound timber removed from the forest growing stock. Waste produced by logging and primary manufacturing operations in the three states of Virginia, North Carolina, and South Carolina alone amounts to 680 million cubic feet a year. Eventually, a little is salvaged for pulpwood and a larger portion for fuelwood, but the equivalent of 6 million cords is never utilized. The unused logging waste alone is sufficient to satisfy the demand for pulpwood in these states.

The obstacles to the fuller utilization of waste are largely economic. Perhaps the most important of these is the cost of handling and transportation. Much of the waste is small material widely scattered through the forest or in small concentrations at great numbers of remote plants. Most of that accessibility located is already being used for some purpose. However, certain areas with a heavy concentration of forest industries and good rail and highway communication seem favorable to plant integration, and mechanization might solve many of the problems of handling.

On the second phase, namely, forest land acquisition, an excellent start has already been made. Pulp company holdings now total 6 million acres. If need be, they could provide over a third of your current needs without over-cutting.

Acquiring land and utilizing substitute woods are both projects which could produce positive and easily measurable results within a few years. The third phase of the attack on the wood-supply problem is, by comparison, more complicated and must be sustained for a relatively long period to accomplish its purpose—that is to say, increased production of quality wood on forest land tributary to your mills. To assure a worthwhile increase, the following minimum management requirements must be met: (1) protection from fire, (2) harvest cuttings which reserve mature trees in sufficient number to reseed the area cut over, and (3) intermediate cuttings in young stands to increase their yield. Omitting any one of the three steps will largely nullify the others.

Some progress has already been made in the fields of forest protection and management. For instance, 53 per cent of our forest land has been brought under organized protection, and public appropriations for this purpose are being enlarged. Two southern states, South Carolina and Virginia, can now boast 100 per cent coverage. Public and private agencies have also planted some two million acres of denuded land. Your own holdings offer an excellent example of the application of management practices. For the most part, they are well cared for. Similar examples of good management are to be found on some lumber-company and other private lands as well as on public forests, but well-managed tracts still comprise only a small portion of forest lands. The area meeting the minimum standards of protection and management probably does not exceed 20 per cent of the total.

A potent factor impeding the wider application of management principles is the complex ownership pattern. Nearly 70 per cent of the forest is in a million and a half private ownerships of less than 5,000 acres each. It is difficult to reach so vast a number of owners and to convince them that present gain should be deferred in favor of ultimately greater and perpetual profits. Few look beyond the present, and few are financially able to do so. As a result, cutting practices are determined largely by a desire for the maximum immediate return. Generally, they result in heavy over-cutting with haphazard restocking, and, frequently, conversion to low-grade hardwoods.

Since it is not probable that the existing ownership pattern will change materially for some time to come, the pulp industry has a considerable stake in the better handling of these small ownerships. In recent years, various public and private agencies, including your own Southern Pulpwood Conservation Association, have been guiding and assisting woodland owners in proper management practices. However, progress has been too slow to prevent continued depletion. These activities must be greatly expanded to obtain increased yields on an ever larger proportion of the forest. They should be supplemented by legislation establishing the minimum standards of cutting needed to prevent further deterioration on those lands not brought under management.

Available Pulp Timber Stands in the Lake States

E. L. DEMON, Director
Lake States Forest Experiment Station

For more than half a century the Lake States region (Michigan, Wisconsin, and Minnesota) has been an important factor in the national production of pulp and paper. At present, there are 131 paper and paperboard mills in the region, 39 of them operated in connection with pulp mills. Only five pulp mills make no paper.

Forty-two per cent of the Lake States current production is sulphite pulp (representing 25 per cent of U. S. production):—groundwood (35 per cent), sulphate (21 per cent), and soda (1.5 per cent) pulp make up the balance.

At present, the Lake States produce about one-sixth of the paper output of the country, representing a great diversification of types of paper and paperboard, much of it of high quality. Principal items manufactured are book paper (28 per cent of national production), fine papers (25 per cent), wrapping paper (22 per cent), sanitary paper (28 per cent), tissue paper (35 per cent), folding boxboard (22 per cent), and building board (20 per cent).

The pulp and paper industry in the Lake States is not self-sufficient in local sources of raw material. In recent years the region has imported about one-fourth of the pulpwood it consumes—mostly spruce and balsam from Canada. Scandinavian countries contributed a small part of the region's wood pulp needs prior to the late war and have already resumed shipments on a limited basis. The consumption of waste paper, rags, straw, etc., amounts to about 40 per cent and new wood pulp 60 per cent of the total fiber used in the region's paper production.

The Lake States region has some 50 million acres of commercial forest land, nearly 11 per cent of that in the nation. However, the original forest has been so heavily cut over that the present saw timber volume (51 billion board feet) amounts to only about 3 per cent of the nation's total.

Although the bulk of the region's pulpwood supplies comes from trees not merchantable for sawlogs, some of the sawlog-size trees also go into pulp, particularly hemlock.

It is estimated that about one-fifth of all timber of merchantable size in the Lake States is of such poor quality, small size, scattered occurrence, or remote location that it cannot be profitably harvested and utilized under current market conditions. For example, one-third of the present 20 million acres of aspen which has replaced the original white and red pine on many areas is growing on such dry, light, sandy soil as to be termed "off-site." Here aspen grows slowly and begins to deteriorate at an early age. About 3 cords of pulpwood per acre is an average stand on these poor sites, and seldom does it exceed 5 or 6 cords. During the war, pulp mills accepted much low-grade aspen of this type, paying about 75 cents per cord stumpage, but it is questionable that such material can continue to be handled profitably. Undoubtedly, proper management can improve the quality and yields from these inferior aspen stands.

The cutover region of the Lake States has long been an outstanding example of heavy tax delinquency, and at least 13 million acres of forest land have reverted to state and county ownership because of tax default.

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All told, about 43 per cent of the forest land in the region is in public ownership—13 per cent is held by the Federal government and 30 per cent by the states, counties, and municipalities. Fifty-seven per cent is held by private owners, the great majority farmers. Only about one-fourth of the commercially available timber is controlled by large operators.

It is gratifying to note within the past few years that many pulp mill owners are acquiring an appreciable amount of forest land. Some of these operators have expressed as a goal the acquisition of sufficient land to produce at least 50 per cent of their pulpwood requirements.

Cutting for pulpwood during the last ten years accounted for about 20 per cent of the commodity drain in the Lakes States. (In 1944, it had reached 26 per cent.) Cutting for lumber made up 44 per cent, and fuel-wood about 20 per cent. Other insignificant commodity items are veneer logs, fence posts, and mine timbers.

The average annual loss by fire, insects, disease, windstorm, etc. during recent years has been much less than formerly and reflects greatly improved fire protection as well as a series of years with relatively high rainfall. However, some of the most severe losses have been in pulpwood species, particularly hemlock, pine, balsam fir, and aspen. Fortunately, good markets during the war years permitted salvage of much material that ordinarily would have gone to waste.

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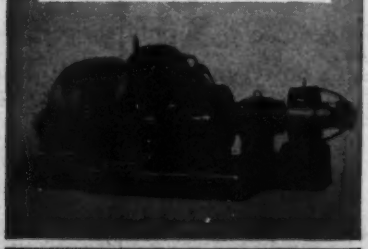

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The region has suffered relatively light losses from insect and disease epidemics in recent years. The most severe attack was from the larch sawfly, from 1910 to 1926, which practically wiped out the mature tamarack in the region. The spruce budworm caused severe damage to spruce and balsam fir from 1913 to 1923. White pine blister rust, forest tent caterpillar, spittle bug, and hypoxylon canker of aspen have caused extensive losses locally and at various periods. Also, forest reproduction is often seriously injured or killed by snowshoe hares, deer, sawflies, and the white pine weevil.

In Lake States pulpwood operations there is relatively little wood waste in the usual sense. Pulpwood, as a rule, is harvested to a 4-inch top diameter (100-inch sticks) and experiments are being conducted to determine the feasibility of using spruce to a 2½-inch top diameter. Many hemlock logs which would be considered cull for saw timber operations are accepted by pulp mills. Several thousand cords of slabs and edgings from sawmills and veneer cores are used annually by pulp mills. Much aspen, of course, dies on the stump for lack of a market.

Destructive logging is still a problem in the Lake States. With but few exceptions, hardwood logging operations are conducted on practically a clear-cutting basis, taking all trees 14 inches d.b.h. and over. In the vicinity of mining communities, sawlog operations frequently are followed by cutting of smaller trees for mine timbers, or railway cross ties.

In second-growth forests the most serious loss of potential growth is from premature cutting just as the stand approaches optimum growth. During the war, the demand for pine, spruce, and other softwoods was so great that almost any size and quality of material was acceptable. Cutting not only for pulpwood but also for lumber, boxes, and crating resulted in liquidating many thrifty young second-growth stands.

Regular programs of forest planting have been under way in the Lake States since about 1910, although a few farmers' plantations were begun as early as 1876. The area planted annually was of limited extent until the advent of the Civilian Conservation Corps program in 1933, when public land planting increased from a few thousand acres per year to an average of nearly 100,000 acres per year. A total of about 1 1/3 million acres has now been planted in the three Lake States.

Slightly over one-fourth of the pulpwood processed in the Lake States is imported from Canada. The Wisconsin pulp and paper companies import about two-thirds of their pulpwood, drawing heavily upon Michigan and Minnesota resources as well as Canadian. Recently, some Wisconsin mills have gone as far as Montana and Idaho for pulpwood. Some are buying up timberlands in Michigan and Minnesota. There are opportunities for pulp companies to associate themselves with lumber and veneer companies for integrated operations, utilizing material that would otherwise be largely wasted.

The trend in use of different species for pulpwood indicates the efforts of the industry to adjust its processes to available timber supplies and its ability to vary the product to take advantage of new markets and new competition. For example, aspen has been used in increasing quantities due to improvements in pulping and papermaking processes. Technical improvements may also open the way to increased utilization of northern hardwoods.

Decreased fire, insect, and disease losses in recent years, combined with favorable weather, has permitted many deforested areas to restock naturally and young stands to improve in density. In the past ten years, areas classified as deforested or unsatisfactorily restocked to seedlings and saplings have declined from 21 million acres to 14 million acres. However, the Lake States forests at present are growing at not more than one-third of their potential capacity.

Some aspen areas are changing over naturally to pine, balsam, maple, and other more valuable species. Balsam fir is coming in very extensively over large areas. In 20 to 30 years substantial volumes of merchantable pulpwood timber will again be available if proper care is taken of existing young stands.

An analysis of the supply and demand as regards spruce, balsam fir, and jack pine pulpwood shows an alarming situation. The supply of spruce, the most valued of pulpwood species in the Lake States, has declined greatly in recent years, forcing pulp mills to use increasing quantities of balsam fir, jack pine, hemlock, and aspen.

A few mills with their own supply of spruce can continue present rates of production for some years to come, but regional consumption of spruce must inevitably go down. Black spruce which makes up 70 per cent of all spruce volume in the Lake States is a swamp species which grows slowly. The remaining merchantable black spruce forests are for the most part over 100 years old and over large areas do not average more than 6 to 8 cords to the acre, largely in trees below 10 inches in diameter. Trees 3 inches in diameter are often 70 to 80 years old or older, due to soil and climatic conditions. On the drier, more favorable sites, black spruce grows to pulpwood size (averaging 6 inches in diameter) in from 50 to 60 years. In typical black spruce swamps, however, growth ranges from 1/15 to 1/5 of a cord per acre per year. There are about 4 million acres of spruce forests in the Lake States of which about 25 per cent is in merchantable stands. Even at the low rate of ⅛ cord per acre growth, they could eventually be made to yield 500,000 cords annually.

The jack pine situation is no more favorable than spruce. Accessible stands are heavily depleted and there are no appreciable uncut areas except in northeastern Minnesota.

There are roughly 20 million acres of aspen in the Lake States (covering 40 per cent of the commercial forest land area), varying from open to dense stands and from low to high productivity. Only about 5 million acres now bear merchantable stands, but present use of aspen is

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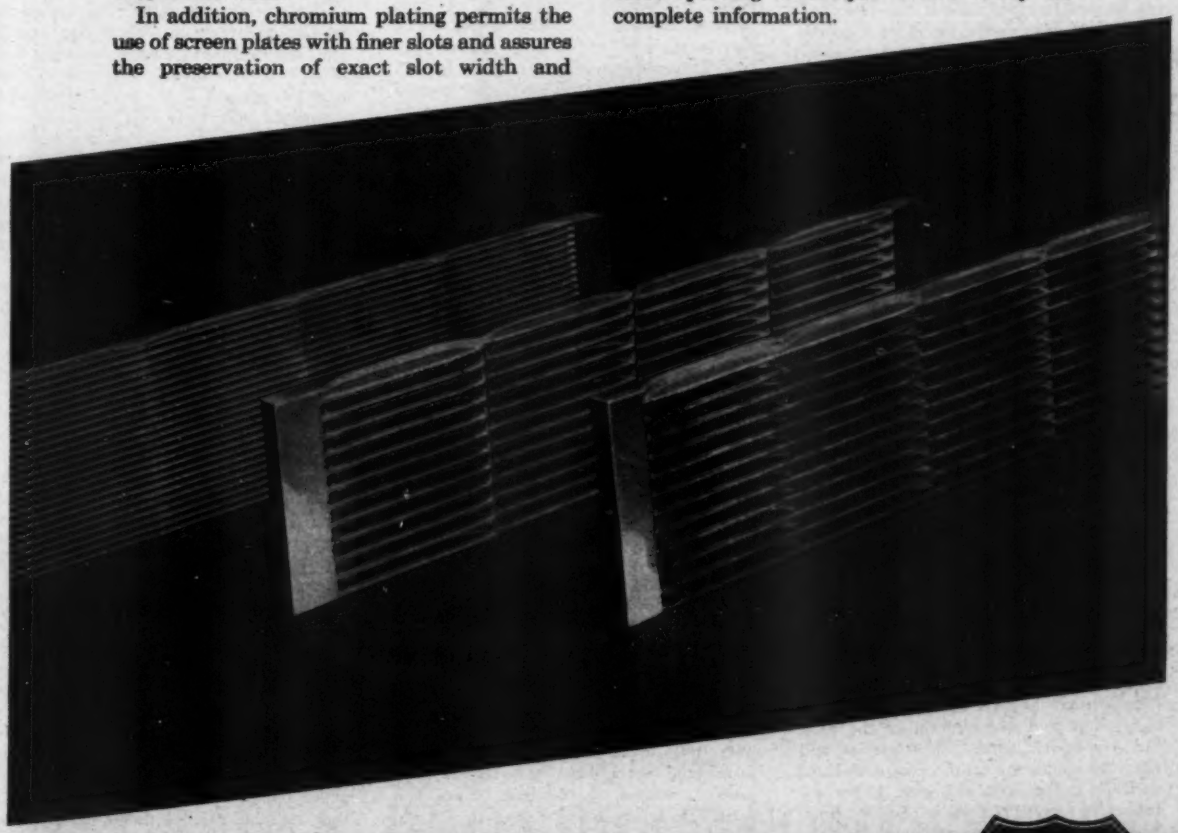

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about one-third of the growth. The present drain on aspen of pulpwood quality, including use not only for pulp but for box boards, excelsior and other uses is about 700,000 cords per year, whereas the estimated allowable pulpwood drain is over 2 million cords.

A major problem is to improve cutting methods in Lake States' forests so that cutover lands will be left in condition to yield continuous crops. This can often be accomplished by removing the present crop in a series of light cuttings, first as thinnings, later by partial removal of crop trees, and then the final harvest, instead of the current practice of clear cutting.

Another necessary step is to still further increase the use of aspen and other little-used species to tide over the industry until crops of more valuable trees can be grown. Also, more complete utilization of the trees cut can add appreciably to the present yield of pulpwood.

A third problem is to restore the 14 million acres of denuded and poorly stocked land into a valuable forest. Part of this will be accomplished by planting, in some cases by solid plantings of large blocks, thousands of acres in extent and in other cases spot planting or strip planting to stimulate the natural conversion of aspen and brushlands to more valuable types. A reforestation program by public agencies should be adequately financed on a continuing basis.

Available Pulp Timber Stands of the West Coast

H. J. ANDREWS, Regional Forester Region 6

The subject of pulp timber stands on the West Coast is interpreted to cover not only the Pacific Northwest, but California, British Columbia and Alaska as well.

A determination of the amount of forest material available to the pulp and paper industry on the West Coast cannot be made with any degree of precision. Volume estimates of pulp species covering various segments of the country constitute a valuable reference base. But beyond this, there is no assurance of the extent to which the so-called pulp species will in fact be used for pulp. The depletion of old growth Douglas fir throughout large areas in the Pacific Northwest makes lumber, plywood, and other wood using plants contenders for species hitherto used almost exclusively for pulp. Operating in the other direction are certain factors such as the current changes in technology and organization of the pulp industry which admit other species and tend to expand the resource base. A third variable to be reckoned with is the intensity of forest practices applied by wood using industries generally and by the pulp and paper industry in particular.

Just how and at what level these adjustments will be made is uncertain, but the important thing to keep in mind is that there is nothing inevitable about what is going to happen. In a very large sense, it is within the means of the pulp and paper industry, through exercise of the proper degree of initiative and resourcefulness, to pretty much shape its own future.

Expansion of the pulp industry in the Pacific Northwest, or even maintenance of present production levels will be conditioned upon the tolerance of mill men for smaller, lower quality material, upon willingness and ability to co-operate with foresters and to use what the forest has to offer. This must be in some contrast to the material obtained under the rigid size, quality and species specifications which have characterized past procurement policy.

In 1944 the Forest Service in the Pacific Northwest conducted a painstaking study of the requirements and supply of old growth private timber in Western Oregon and Washington. Among other things, it was designed to show for individual plants the expected life in old growth private timber estimated to be available.

As a class, pulp mills appeared to be in a much stronger position than the average of all plants in respect to private timber owned or controlled. Three of them, representing 11 per cent of total pulpwood consumption, had sufficient private timber for 1-5 years of operation; 3 others, representing 23 per cent of total consumption, were in the 6-14 year class, and 16, representing 66 per cent of consumption, were good for 15 years or longer in private timber owned or controlled. Of course, in addition to private timber, substantial volumes of public timber will become available and have its effect on the life of plants. However, the amount available annually on a sustained yield basis is not nearly enough to fill the needs of all types of wood using plants, and the competitive bidding procedure for public storage precludes any prediction of its ultimate disposition.

I believe that future, whatever it is, depends upon what the pulp industry does about the following propositions:

1. Competition with lumber and veneer mills for hemlock, spruce and true fir logs of large size and high quality. Without doubt, pulp plants can and will continue to share in the supply of such material, but continued dependence on it as in the past will quite obviously entail higher prices and short supply.

2. Utilization of smaller, lower quality material. Pulp mills can run on material which in the Northwest is little used and unwanted by most other wood using industries. General utilization standards in both the woods and mills of all types are such that a tremendous wood volume in pieces of respectable size and quality is now wasted. A recent study based on over 300 one-quarter acre sample plots distributed throughout the region indicates a volume of so-called "waste material" ranging from 8,000 to 17,000 board feet of sound wood per acre. The average volume applied to the total acreage cut in 1944 indicates a staggering total of 3.6 billion board feet log scale left in the woods. This includes only sound material in pieces of scalable size. A cubic foot estimate of sound material as small as 4 inches in diameter, 4 feet long amounts to nearly 1 billion cubic feet annually! An estimated 35 per cent of this is of pulp species other than Douglas fir.

Add to this an estimated 537 million cubic feet of sawmill "waste" in the Douglas fir region and one begins to get an idea of the raw material opportunities for a scavenger industry.

3. Related to the above is the matter of a shift from the production of sulphite pulp to sulphate pulp, which will admit of the extensive use of Douglas fir, lodgepole pine and the like. There may be a site or two in the region where available old growth hemlock and balsam fir could sustain new sulphite capacity, but any significant expansion, or indeed maintenance, of pulp production, must, if it is going to be well founded, stem from the use of material other than old growth hemlock, spruce, and the true firs.

4. The question of forest practices. This hardly calls for elaboration because the relationship between intensity of forest practices and productivity of land is well known. Just one item sometimes eludes folks who are not thinking about these matters every day. It is not enough to provide merely for prompt regeneration of cut over lands. Reasonable care will usually assure that in our country. But intensive forestry enters the picture with the subsequent treatment of young stands. The 500 to 1,000 or more trees per acre which become established undergo a thinning out process as the stand approaches maturity. Left to itself, surely a third and probably more of the total rotation growth of a stand succumbs to crown and root competition. Such wood constitutes a supply that has never been salvaged in the North West. Furthermore, its removal as thinnings would accelerate development of the crop trees.

The above are some but not all of the factors which will affect the future of the pulp and paper industry in the Pacific Northwest.

In California, the situation is considerably different. The commercial forest area of California supports 194 billion board feet log scale of timber which is technically usable as pulp. Of this, 142 billion is of a quality and is so located as to make it commercially available. It consists of 62 billion feet of ponderosa and sugar pine, 46 billion feet of Douglas fir, and 34 billion feet of white and red fir (*Abies concolor and A. magnifica*). The total of 142 billion feet is almost equally divided between public and private ownership, each having 71 billion board feet.

In California, there is also a total volume of some 40,987 million board feet of redwood (coast form only). Of this, some 33,176 million feet are available, the balance of about 4.7 billion feet being either unavailable economically or withdrawn for some purpose or other. Of the available timber, some 996 million feet are in public ownership, while about 32,180 million are in private ownership.

The value for lumber is so great as to practically preclude the use of ponderosa pine and sugar pine for pulping purposes except in the form of logging and sawmill waste. The true firs have always been considered less desirable for lumber

Draper's

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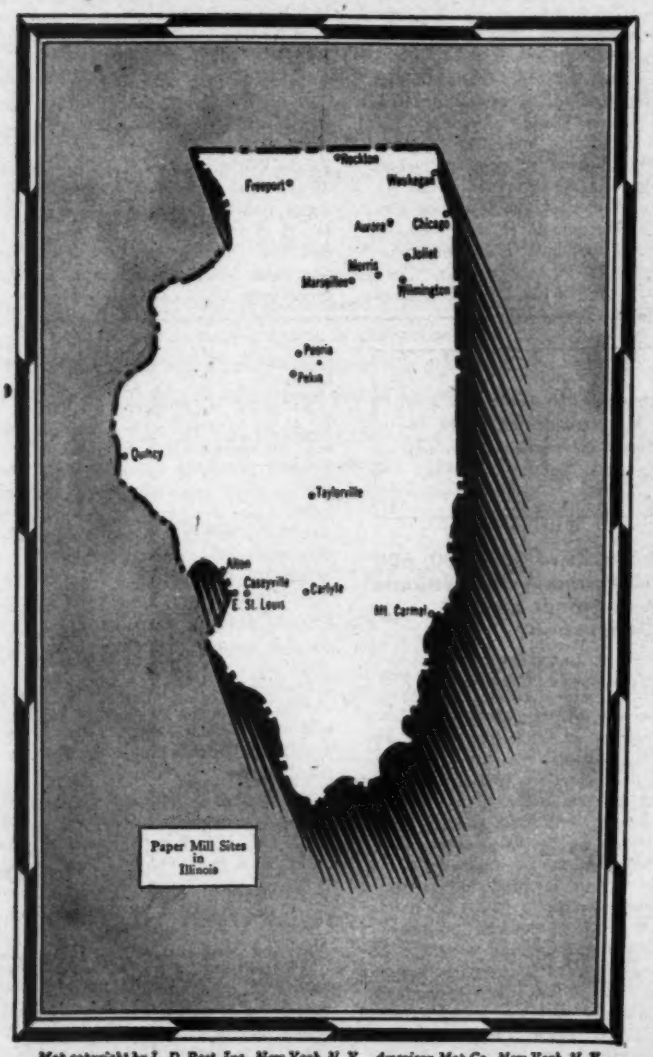

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HIGH LIGHTS:

Illinois rating ninth in production of paper and paperboard, is notable for the manufacture of utility or mechanical papers. Being a prairie state, it lacks great stands of forests suitable for pulp wood and depends largely upon native-grown straw and waste papers.

Of its thirty-eight paper machines, thirty-three are cylinders, devoted to a wide variety of paperboard manufacture. Strawboard and straw paper for corrugating are characteristic products of the southerly mills of the state, but elsewhere asbestos, stereotype mat, insulation and leatherboard are made. Felting, roofing and saturating papers are also produced in large quantity.

One company does produce excellent quality of Fourdrinier paper for offset printing, index bristol and papetries, for which a ready sale is found in the great printing center, Chicago, where the payrolls for the graphic arts, surprisingly enough, exceed those of the famous packing industry of that great metropolis.

Papermaking was featured both at the Columbian Exposition at Chicago in 1893, and at A Century of Progress in 1933 by actual demonstrations of the manufacture of paper. As a distributing center for the paper industry, this city is unsurpassed.

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with accompanying lower stumpage prices. They were, however, cut to a remarkably increasing degree during the war. This heavy competition for stumpage would seem to offer little attraction to the development of a pulping industry in this state. In addition, there exists a lack of water for pulping purposes in close proximity to the raw material in the Sierre Nevadas and the northern coast ranges. Most of the water flowing from these mountain streams is of very high value for irrigation, domestic, and industrial uses in the valleys below. Its pollution by pulping processes would not be tolerated by the people of the state.

On the other hand, there are certain factors which would favor the development of a pulping industry in California. The first of these is the presence of good pulping species, particularly the true firs. These species are aggressive in reproduction and are persistent over a large area of the commercial forest belt. A second factor favoring the development of a pulp industry here is the strong and probably increasing local market for pulp products.

In light of these favorable and unfavorable factors, it appears that the best possibility for development of pulp mills in California would be on the main rivers near tidewater where abundant water would be available and where upstream pollution would not injure the water supply for other purposes and the use of low grade pulp materials, primarily the lowest grade of logs and logging and sawmill waste, as raw material. Any such development would necessitate the transportation of the raw material largely by rail and mostly over considerable distances from the forest to the mill.

As to the present situation, there is now in course of construction at Antioch, California, near the confluence of the Sacramento and San Joaquin Rivers, a fiberboard pulp mill. It is understood that this concern may log white and red fir in higher altitudes in the Sierra Nevadas for transportation to the mill. It is also endeavoring to get commitments for shipment of sawmill waste from a number of the larger and more permanent mills in the west side Sierra district.

There is also considerable activity at the present time on the part of manufacturers of gypsum board and felt roofing material to secure raw materials for pulping. A number of these concerns operate in California and are becoming highly competitive for raw material. In the past they have used redwood sawmill waste to a considerable degree and have also purchased considerable amounts of eucalyptus. They also are now approaching sawmill operations in the California pine belt concerning the shipment of sawmill waste to their factories.

In Alaska the commercial timber resources are confined to the coastal spruce-hemlock timber types extending north and west as far as Afognak and Kodiak Island. Almost all of this type of forest is included in the two National Forests, Chugach and Tongass. There are no private timber holdings. The estimated total stand is approximately 83 billion board feet, of which 78 billion feet are included in the Tongass National Forest of Southeast Alaska. The coast forest, as a whole, averages about 73 per cent western hemlock, 21 per cent Sitka spruce, and 6 per cent minor species, primarily western red cedar and Alaska yellow cedar. About 70 per cent of the timber is within 2½ miles of tidewater along the thousands of miles of island and mainland shores.

Timber quality of the forests generally is poorer than the forests of the same types in Washington and Oregon, with shorter trees and a smaller percentage of high-grade logs. However, there is a small proportion of very large and exceptionally high grade spruce trees growing as individuals or in small clumps throughout the timbered areas. The trees become smaller as one progresses to the northern and western limits of the coastal forests in North America, which are found in the vicinity of Kodiak Island.

It is estimated that about 80 per cent of the timber volume is primarily valuable for pulpwood. The remaining 20 per cent of the volume obtained in extensive pulpwood logging would be most valuable for spruce veneers, and spruce and hemlock sawlogs.

Clear cutting, leaving groups of seed trees, has been practiced to date and is likely to be continued as the most satisfactory method of obtaining reproduction. Selective logging is not believed adaptable except in a few selected locations, due to shallow soil and excessive windfall.

At the present time the Alaska timber is being investigated by several pulp and paper companies which are considering the establishment of plants in the territory to draw upon the 1½ million cords or more of wood which could be made available annually for pulp. The larger and high quality material coming out of the forests along with this pulpwood could support a substantial increase in the present sawmill capacity and a few medium size Pacific Coast type of veneer plants. The pulpwood available in Alaska on a sustained yield basis will produce one million tons of newsprint annually.

The British Columbia coastal region is the west coast region second only to the Pacific Northwest in point of pulp production and importance of the pulp and paper industry. A review of the Sloan report of 1945 leads me to the conclusion that the requirements and supply situation there is not unlike that in the Pacific Northwest.

Abridgments in this section are from papers presented at the ***TAPPI Engineering Conference*** held in Milwaukee, Wis., October 2-4, 1946.

Relative Merits of 200, 400, 600 and 1200 Pound Pressure Plants for Process Steam and Power Generation

F. E. LARAMORE
Laramore & Douglas

The ideal situation for any power plant serving a paper or pulp mill is to be capable of generating its entire electric power requirements from the steam needed for process without recourse to steam condensers to force a balance. This may not always be possible but in many cases this situation can be attained.

The first step in the problem confronting any particular plant is to determine the amount of steam required for process and to determine whether or not this process steam can be reduced to a relatively few pressure categories or at least to confine these pressures to groups which can be used as bases from which the lower pressures in each group can be obtained through pressure reducing stations. This will then provide the basis for a study of possible balance between power and process. It is evident that if all the electric power requirements can be produced well within the range of the steam process load then the ideal situation has been attained.

The basis efficiencies of steam turbines used for generating power increase as the size of the units increase and decrease as the initial pressure increase. However, the theoretical efficiency increases with an increase in initial pressures and temperatures.

In order to illustrate the results that might be expected under different operating pressures and temperatures I have selected a definite size of turbine generator—a 5000 kw. unit, which unit would be of a size used in a larger than average size mill—and will make comparison on this size unit. Fundamentally the same conditions will apply in a plant where the power requirements are greater or smaller.

To further fix the basis for comparison, we will assume a process steam requirement of 10,000 lb. at 40 lb. gauge, for each ton of product. The amount of electric power required per ton of product will vary considerably depending on the amount of stock preparation and the finished product.

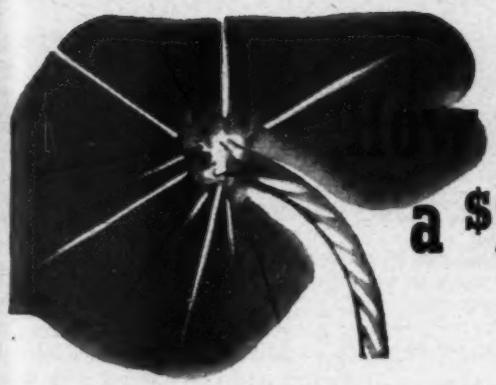
Using 200 lb. gauge and 600° T.T., it would be possible to generate 312 kw-hr. from each 10,000 lb. of steam being used for process at 40 lb.

At 400 lb. 750° T.T.—466 kw-hr.
At 600 lb. 825° T.T.—551 kw-hr.
At 1200 lb. 900° T.T.—642 kw-hr.

The exhaust temperatures will vary in each of the foregoing examples to some extent—each containing some superheat, which may or may not be permissible for the process for which it is to be used.

In cases where process steam is required at higher pressures than indicated, it can be secured by extraction. The electric load will in many cases be proportionally small enough to permit extraction at higher pressures without throwing the setup out of balance.

In the paper and pulp industry a considerable amount of steam may be used by direct application for heating process water, used in digesters, etc. This results in comparatively high make-up in the feedwater cycle, which will require proper



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conditioning if boiler operation is to be held to high efficiency and low maintenance. The character of the make-up water may exert considerable influence on the selection of the operating pressure for any specific situation, not only from the standpoint of the investment required in feed water treating equipment, but, also, in the cost of operation and the ability of the operators to properly operate such equipment. Another factor that must be considered is what effect the treatment will have upon the use of stage heaters the use of which may be desirable in securing a balance between the process steam and electric loads.

The use of higher pressures may at first thought seem to entail considerably more investment. However, this may not necessarily hold true, if a complete analysis is made of the particular situation under consideration. It is true that high pressure boilers cost more but this increase in costs is confined to the pressure parts. If the proper pressure is selected to produce a proper balance between the steam and electric loads, it will be found in many cases that the condenser can be eliminated entirely permitting additional expenditure for high pressure equipment such as boilers, turbines, piping, etc., without increasing the over-all costs.

The cycle of operation for each particular situation must be thoroughly analyzed to determine the steam and electric requirements during periods of production and down periods and the duration of each period.

Satisfactory balance may be obtained during the operating period with practically no chance of balancing on down or non-productive periods. However, sufficiently better balance may be obtained during the production period to completely outweigh any disadvantages that occur during non-operating or down periods. In such cases, very little investment can be justified to secure efficient operation for the down or non-productive time.

The steam pressures required for process in any particular situation will have a direct bearing on selection of the initial or generating pressure. It may be found that it will be more economical from the standpoint of first cost as well as provide a more satisfactory operating condition if corrections are made in the process equipment so that relatively large quantities of the process steam can be used at the lower pressures. Improper application or wasteful use of process steam will offset the efficient production in the power plant. We are not interested in efficiency of the power producing equipment but rather in what is the minimum amount of steam and electric power necessary to produce each ton of product.

Let us consider briefly a specific case for a paper mill producing ten tons per hour:

Dryers will require 5000 lb. of steam per ton or	50,000 lb. total
Vapor absorption system will require 1900 lb. of steam per ton or	19,000 lb. total
Water heating will require 2000 lb. of steam per ton or...	20,000 lb. total
Heating and ventilating	15,000 lb. total

The mill will also require 400 kw-hr. per ton of electric power for driving the various units of equipment used in the process.

Inasmuch as the steam required for heating and ventilating is seasonal, a balance between the electric power and process load should be worked out without including the heating and ventilating load.

We have, therefore, a total process steam load of 89,000 lb. per hour and an electric load of 4000 kw.

We will assume for the purpose of this study that the highest pressure required for process is 40 lb. gauge. The water rate of a turbine operating at 40 lb. back pressure, of suitable size to handle this load taking steam at 400 lb. gauge and 750° Fahr. T.T. is approximately 21¼ lb. per kw-hr. Therefore, with a steam load of 89,000 lb. per hour it would be possible to produce 4180 kw. per hour which is slightly more than our electric requirements. In fact, it is almost a border line case. Some additional leeway could be secured by using steam extracted at higher pressures for feed-water heating.

If the steam load required per ton should be less or the electric load more per ton of product than cited in the example, then it would be necessary to consider operating at a higher pressure and temperature.

We believe the application of process steam and power is just as important as its production, therefore, the complete cycle must be analyzed in each case before a selection is made of the proper pressure to use.

Kraft Mill Maintenance

WILLIAM McINTOSH, JR., Maintenance Engineer
Union Bag & Paper Corporation
(Savannah, Ga.)

Maintenance in a kraft mill is fundamentally the same as in any other pulp and paper mill; the principal difference being in the kinds of material used to withstand the alkaline liquors. This paper will cover principally the pulp mill.

In the wood yard, most of the southern mills are using a combination type chain for conveying wood with about as many different kinds of attachments and drives as there are mills. Where water is used for lubrication, the water and/or the acid formed by the bark will etch the hardened pins and cause excessive pin breakage before the barrel links wear out. Zinc or cadmium coated pins under such conditions, will materially increase the life of the chain. An automatic finger type switch, just back of the drive sprockets on the return side of the chain, to stop the motor when the chain breaks, will reduce lost time when a chain break does occur. The tremendous pounding a barking drum gets from the tons of wood passing through crystallizes the steel in time. The tighter a drum is kept during operation, the longer the crystallization is delayed. Wood should be admitted to the drum in such a way that it falls principally on the wood and not on the drum shell, otherwise the shell at the intake end will crystallize prematurely.

In the digester room, more and more corrosion resistant materials are coming into use. As yet, we do not know of any stainless clad digesters in use on southern kraft.

When building up a corroded carbon steel digester, a satisfactory job can be done by using Fleetweld No. 5 rods or equal, preheating the work and peening the weld when completed. In preheating, the use of Tempilstiks, or equivalent, has been found very useful. These sticks are somewhat similar to a colored chalk stick and can be bought for various temperatures. The metal to be preheated can be marked and when the proper temperature is reached, the chalk mark turns black. If put on a surface at or above the temperature printed on the stick, it will show as a liquid smear. This procedure, followed by peening the finished weld, gives a satisfactory job and is worth the extra time involved.

A good many types of blow valves are in use. The use of alloy steel in any type blow valve will extend its life.

For blow lines, the general practice is to use steel pipe; some mills using double extra strong pipe. The drilling of weep holes in the blow line, particularly in the bends, will help to give advance notice when replacements are needed.

In the cyclone and blow tank, a stainless steel or stainless steel clad wear plate cuts down on carry over and maintenance. A plate too thin, however, will give trouble from vibration and breathing.

In diffusers, the greatest trouble is caused by pitting. This type corrosion is also found in cyclones and in some liquor piping. Our observation has been that this type of corrosion occurs generally where a container is subjected alternately to black liquor and white water, fresh water, steam or condensate.

A Monel screen plate in diffuser bottoms definitely reduces the fiber loss because of less frequent failures and reduces maintenance.

A liberal use of alloy metal on pulp washers will be found to be quite an advantage in the long run as down time on a washer drum will generally affect production a great deal more than taking one diffuser out at a time for repairs.

There is quite a wide variation, from mill to mill, in the life of carbon steel tubes in 1A and 1B evaporator effects. Most mills, however, have gotten such short life that stainless steel tubes have been installed. Some mills have also installed stainless tubes in the No. 2 effect. Stainless is very satisfactory and we do not yet know of any failures. A stainless clad tube sheet must be installed when the stainless tubes are put in, for otherwise the tube sheet will fail in a few years. Cladding parts of the dome and steam chests will eliminate a major job every few years. While the tube life in the other effects is good, there is a need for a tube that will not scale up so easily. One suggestion which has not yet been completely investigated is carbon steel tubes, chromium plated on the outside.

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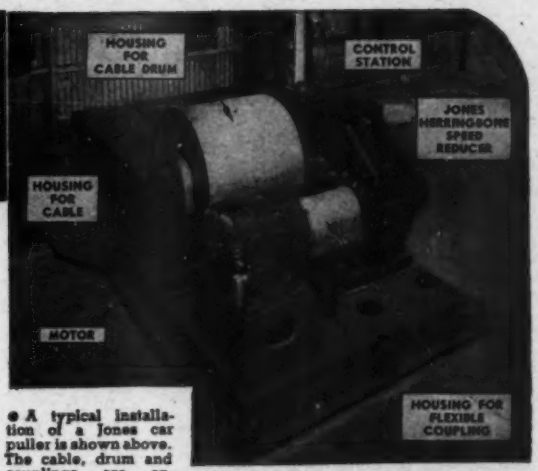

● A typical installation of a Jones car puller is shown above. The cable, drum and couplings are enclosed by sheet metal housings as an extra precaution in this installation to eliminate all hazard from moving parts.

● A complete Jones car puller unit. These outfits are for use with wire rope and are manufactured in a wide range of capacities to suit the number of cars to be handled in each plant.

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A gradual replacement of the liquor lines around the evaporator with stainless steel, and possibly the cast iron fittings with Ni-Resist fittings, will in the end, reduce maintenance and down time for repairs.

Alloy pumps in the evaporator room will also help considerably to reduce down time and maintenance.

For evaporator surface condensers, carbon steel tubes, chromium plated on the outside have been found very satisfactory.

In the recovery room, the dissolving tanks should be lined or they will have to be replaced every few years. A special grade of brick has been found very satisfactory for this. Some have been lined with concrete or a hard burned common brick. For concrete or mortar used in white or green liquor, a mixture of half Portland and half Magnolia cement has been found better than all Portland.

A propeller type agitator that will give adequate agitation is much better than the older drag type agitators. They are less apt to be damaged by lumps, bricks, etc. Alloy pumps for feed pumps, pump out pumps and circulating pumps materially reduce maintenance.

In the caustic room, the life of the clarifier trays varies quite a bit from mill to mill. While several attempts have been made to work out a combination of materials to extend the life; we do not yet know of any really satisfactory solution. Stainless or Monel no doubt would do the job, but would be an expensive installation.

Flow boxes for the clarifiers, lined with cement, have proved very satisfactory. The cement must be well anchored to the metal box by welding nuts, etc., to the steel, 1½ inches to 2 inches of cement is ample. Stainless or Monel sleeves must be used for any piping through the lining; otherwise the cement will have to be broken out to renew the pipe. A sleeve can be made out of 10 or 12 ga. sheet and a steel flange made and welded on. From the flange, any kind of pipe desired can be used. A cement lining in the slakers and retention tanks is necessary if not made of some corrosive resistant material. A chilled iron plate at least half the diameter of the tank should be installed under the agitator, otherwise the grit will abrade the cement bottom in short order. Troughs, etc., around the classifiers and retention tanks can well be made of clad material. Alloy pumps from the retention tanks will materially reduce the maintenance at this point. If the causticized liquor does not have a retention period before it is pumped, a great deal of trouble will be experienced with the lime building up in the pumps and pipe lines. On the other hand, if the reaction has been more nearly completed, very little trouble will be experienced.

White and green liquor tanks can be satisfactorily lined with a hard burned common brick on the inside. White liquor tanks especially, will start leaking in a few years if not protected.

Starting and stopping kilns too frequently is hard on refractory life, as is a burner that impinges too much on the brick. Kiln drives should be provided with some dependable way of rotating the kilns in case of failure of the primary power source. If a kiln is not rotated until it cools down, the hot end will sag and when started up again is very apt to run eccentric.

For liquor lines throughout the pulp mill, quite an advance has been made in the last several years in both piping and valves. While the first cost of the alloy materials is higher, their use definitely reduces repair labor costs, inconveniences due to shutdowns, and has some effect on reducing chemical losses.

Some of the better known materials used for liquor piping are stainless steel, Monel, cement lined steel pipe, cast iron with a low nickel content and Ni-Resist.

A standard weight black pipe lined with a special cement and sold under various trade names, such as Permaline and Duroline, have proven very satisfactory for white, green and most black liquor services.

This pipe has to be installed with care and can only be used with flanged fittings, but has the advantage of a lower first cost when compared with some other types, and the life is satisfactory. This pipe should be sawed with square ends, threaded, and a flange screwed on. The face of the flange must be flush with the end of the pipe, so the end of the steel pipe is protected by the gasket. A patching cement is available in case the lining at the ends cracks out. Where there is not too much abrasive action, this pipe will last several years, even in places where

steel pipe goes out in 12 to 24 months.

There are several good valves on the market for kraft liquor service. The principal requirements are a solid alloy disc, renewable alloy seat rings flush with the valve body ports, alloy iron body, outside screw and rising stem with T type disc connection. A valve of this type will last considerably longer than an all iron valve.

Besides the use of alloys for corrosive conditions, slight changes in troublesome spots can often reduce maintenance and lost time. A good inspection and lubrication program will prolong the life of equipment that is subject to normal wear only.

A great deal of thought can be applied to what spare parts are needed, and if on hand, where they are located.

On a shutdown, much time can be saved and total maintenance costs reduced, if first a list of the work to be done is made up and gone over carefully to determine any jobs that can be done on the run without any loss of production on the paper machines. Next, each job should be carefully planned so it can be done most efficiently. All material should be assembled and fabricated where possible. It may be possible to do a portion of the job while the mill is running. Just before shutdown, all material and auxiliary equipment to do the job should be moved to location. When the actual shutdown takes place, the mechanic who already knows what jobs he will do moves in with his hand tools and the job is completed much sooner than if only half planned and pre-assembled.

Experiences with a Spreader Stoker Installation

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As the stream demand in the Rothschild Plant of the Marathon Corporation increased, there were several changes and additions made in the boiler plant, which doubled the original boiler capacity and increased the boiler efficiency at the same time.

The main boiler plant consists of six boilers from 22 to 30 years old. These are —four 390 hp. four-drum bent tube boilers, one 600 hp. four drum bent tube boilers, and one 871 hp. straight tube cross-drum boiler. In addition to these boilers, there are six 37 year old Scotch Marine boilers used to burn wood refuse from the wood-room operations and the hogged wood from nearby sawmills, when it is available. This old plant is also used as a standby in case of a breakdown of the water tube boilers.

Originally the boilers were equipped with underfeed stokers of two different makes. With the underfeed stokers, our average monthly rating was about 75 per cent in summer and 120 per cent during the winter, with a yearly average of 110 per cent. As our load increased, part of the underfeed stokers were removed and overfeed spreader stokers were installed. Now all our firing is done by overfeed stokers. The overfeed stokers are capable of burning most coals of characteristics from hard coal screenings and coke breeze to high or low volatile, high or low ash fusion point coals. We also successfully burned reclaimed waste sulphite liquor on them, which has about 50 per cent moisture and about 4000 B.T.U. per pound, at a continuous rate of 95 pounds per square foot of grate surface.

The main contribution to the success of the type of overfeed stoker we are using can be attributed to the novel tuyere design. Due to its angular air injection uniformily over the entire tuyere area, combustion occurs closer to the tuyere surface. This angular air injection also creates a turbulence which compensates in part for the time element lacking in a low set boiler.

When the stoker equipment is properly operated there is never over a four minute fuel supply in the process of combustion at any time, and load swings varying from fifty to two hundred fifty per cent of rating can be handled over a period of a few minutes. There is at no time a fiercely burning bed of thick fuel to continue to make excess steam after the peak steam demand has passed. This is also an advantage in safeguarding the boiler from damage in an emergency if the feedwater supply failed for any reason.

Among the problems that had to be solved were wet, dirty steam, scale in boilers and preboiler equipment, oxygen and other intrained gases corrosion of preboiler equipment, and the protection of boiler metal from embrittlement.

A direct-contact, deaerating heater of ample size with additional storage capacity was installed with an automatic steam make-up valve which holds the heater temperature of 212 degrees at all times. This removes most of the oxygen and some of the other gases. Steam purifiers with rapid dumping traps, which are able to handle large amounts of muddy water, were installed on each boiler. These purifiers and traps reduce the amount of moisture in the steam to less than one-half of one per cent. Internal baffles were also installed in the steam drum to help reduce the load on these traps and to prevent slugs of water from going up the stream nozzle. Feedwater regulators with differential pressure regulators were installed on each boiler to hold a safe water level with a minimum of fluctuations. This also helped reduce wet steaming conditions by keeping only a minimum safe level in the boilers.

A continuous blowdown system was installed with a heat exchanger which recovers a large percentage of the heat in the water blown down from the boilers. The amount of blowdown from each boiler is regulated by a valve which is controlled by the feedwater regulator. It blows down a predetermined percentage of water entering the boiler. In this way, the concentration of solids and soluble salts is kept constant with a minimum amount of water wasted.

The boilers were equiped with meters to record and indicate the amount of steam produced. They were also equipped with draft gages, recording pressure gages and thermometers. To further guide the operators, steam flow-air flow meters were installed. They record the steam and relative air flow and co-ordinate them on the same chart. This indication permits the firemen to control firing and produce the best fuel economy in addition to controlling other loses and operating troubles.

The steam demand to the pulp mill, bleach plant, etc. fluctuate widely, often varying at a rate of 100,000 pounds per hour within a few minutes. The load changes are beyond the control of the steam plant operators. To supply this swinging demand, we installed a standard metering type combustion control, with revision of our own. With the stokers and auxiliaries capable of following the steam variation quickly, the combustion control keeps the steam pressure constant within a narrow range. The control operates simultaneously the forced and induced draft dampers on the boilers and economizers, changes the amount of fuel fed by the stoker, and keeps the desired draft in the furnace. It also changes the speed of the fan turbines and engines, and distributes the load between the boilers so that each unit carries its share. The fuel and air ratio is correctly maintained over a wide range of steam demands by the use of controllers which follow a predetermined curve to supply the proper amount of air regardless of the position of the controlling dampers.

The bent tube boilers, as installed, had the standard vertical baffles. These were replaced by cross flow baffles which reduce the possibility of short-circuiting, promote more efficient transfer of heat and put more heating surface in the first pass of the boiler. These baffles allow the soot blowers to do better work and reduce the number of places where soot and fly ash can remain. There is less heat reflected down on the grates which helps to reduce clinkering. The baffles are made of reinforced fire proof plastic which results in a thin, gas-tight and fireproof wall of great strength.

Induced draft fans were driven by steam engines. In some cases the power of the engines was increased by changing the valve design. Where the engines were too small, they were replaced by motors. In this way, the available induced draft was increased to take care of additional gases and also to compensate for the resistance of the fly ash collectors.

To collect fly-ash, we installed novel collectors inside of our chimneys, and resting on the top of the firebrick linings inside.

The arrestor consists of a double walled metal cylinder with a stationary helicoid near the bottom which gives the stack gases a directional change. Cinders and ash are deflected by the helicoids and are forced to travel around the inner jacket, ultimately passing through the collector into the annular space between the double wall where they are caught in a downward whirling draft and swept into gravity conveyor pipes.

The cost of these collectors was low and they take up no space in the boiler room. They have proved very satisfactory and we have had no fly ash complaints. The fly ash collected in these devices and also that collected in the last passes of the boilers and economizers is returned to the furnace with high pressure air where it is

reburned. This represents a noticeable heat recovery.

Our boilers are set in battery and the boiler installations and settings are such that it is impractical to install water cooled walls. To reduce fire brick maintenance and outage due to refractory failure, we installed sectionally supported air-cooled and insulated walls using intermeshed tile for battery walls, bridge walls, arches and other parts of the furnace which get the most severe service. The supported walls have longer life, make repairs simpler and greatly reduce the number of brick required to make repairs in addition to reducing maintenance and boiler outage time and cost.

We realized there was considerable leakage in the conventional type of breeching dampers due to twisting, warping and settling of the breechings. The loss through our economizer by-pass dampers was particularly bad. These conditions lowered the efficiency and capacity.

We replaced these dampers with a type of roller curtain damper which prevents this undesirable leakage. These dampers are simple in design—being a flexible curtain held in place against the sealing strips by the draft, this automatically producing a tight seal. The curtain is rolled up to open the damper and can be completely closed or left partially open as desired. The need for a close fit is eliminated and its operation is smooth and free, even if foundations settle or warp. The curtain dampers give about 200 hp. additional capacity and 50 Fahr. increase in temperature of the gases entering the economizer due to elimination of pollution by alien gases.

Another way we saved fuel was by reducing the steam used in the boiler house itself. For instance, we installed a more efficient steam jet ash conveyor system which moved ash much quicker, used much less steam per hour and reduced maintenance on the conveyor system to almost nothing. Other savings were made by using air heaters to reclaim excess low pressure steam at times when it cannot be utilized entirely by the feedwater heater: and reducing the steam used for soot-blowing by always blowing the minimum amount necessary to keep the tubes clean.

To take advantage of many types and sizes of coal available, we rebuilt our coal crusher so it would crush to smaller maximum sizes. In order to burn degradations, excessive fines and by-product fuels, we installed coal mixing equipment so that we can thoroughly mix different types of coal. In this way, we can successfully burn many coals which cannot be burned efficiently by themselves, or cannot otherwise meet our steam production needs when burned alone.

We waterproofed our coal storage piles by spraying an emulsion on them. This keeps the rain, ice, and snow out and prevents excess freezing in winter. The coating is air tight and helps to prevent fires and reduces losses while the coal is stored.

Then we investigated and experimented with Superchargers and found we could substantially increase our present steam production and efficiency by their use. We installed them on all our furnaces in the Rothschild and Menasha Divisions, and are now installing them in our Menominee Plant. The results proved most gratifying, satisfactory and profitable.

The Supercharger installation has unique blowers which deliver air at a pressure of about 30 inches of water, at a high efficiency over a wide range of working conditions. Thirty inches of air pressure is high pressure air in boiler room practice where prevailing fan designs deliver air at 4 to 6 inches pressure with a high of 8 inches. The blowers are small and compact in size, light in weight and can easily be mounted around a boiler or can be hung on the boiler setting itself. No special foundation need be provided for them as they can be installed almost anywhere. They run without noise or vibration and are not easily affected by heat and dirt. The Superchargers are controlled by electric-eye robots.

The Superchargers introduce high pressure air to the furnace through a series of manifolds and nozzles. Each installation usually requires a different method, point of application, size of manifolds and nozzle arrangement to approach perfect results.

Unlike other systems of over-fire air which try to create a turbulence in the furnace by whirling the gases in circles, this system creates turbulence by mixing the air with the products of combustion by the use of multiple air streams flowing parallel with the fuel and flame travel. In this way, the Supercharger produces almost instantaneously, complete combustion, not only of carbon monoxide, but other hydrocarbons, etc. which escape from most furnaces without burning completely.

With Superchargers smoke and combustibles are completely burned and all stratification of gases is removed before they reach the boiler. This allows all parts of the boiler to absorb the maximum amount of heat, thereby lowering the outlet flue gas temperatures considerably and reducing their volume. This volume is further reduced by being able to get complete combustion in the furnace with much less excess air than is otherwise needed for more or less incomplete combustion common with most stokers and other types of firing equipment.

We were satisfied that the over-feed stokers alone gave us a fast steam pickup but with over-feed stokers and Superchargers together, we get a steam pickup that approaches that possible with powdered fuel.

Abridgments in this section are from papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, February 25-28, 1946.

De-Inking of Waste Papers

H. O. WARE[1] and R. T. MASHBURN[2]

The Hollander washer beaters used in this study are of commercial size and conventional construction having one beater roll, a dummy bed plate, and two octagonal washing cylinders covered with 60-mesh wire. Specifically the washer is 23 feet 11.5 inches long, 10 feet 2 inches wide, with a working depth of 36 inches. The operating capacity of the washer is estimated to be 576 cubic feet, equivalent to approximately 36,000 pounds of water.

The old papers are cooked in a rotary cooker, dropped into a pit, diluted with fresh water, and charged to the washer by a centrifugal pump. During washing, fresh water is continuously added to the beater washer ahead of the beater roll

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at a rate of approximately 1,000 pounds per minute. The fresh water moves with the stock under the beater roll where it is thoroughly mixed and passes to the opposite side of the beater washer where a portion of water equivalent to the fresh water addition is removed by the octagonal cylinders. By this system of washing, water is added continuously to the beater washer at one point and is continuously removed from the beater washer at a different point, while the stock is travelling continuously around the beater washer. Even though this operation appears to be functioning in a continuous manner it can be demonstrated that theoretically the beater washer is washing in a series of stepwise displacements wherein the contents of the beater washer are subjected to one displacement step each time it travels around the beater washer. These stepwise displacements result primarily from the fact that the beater mixes only a small fraction of the beater washer contents at a time. The quantitative relationship between the series of stepwise displacements and the amount of washing achieved are factors of prime importance in evaluating the operating variables and establishing the efficiency of the washing operation.

TESTING PROCEDURES

Ash Procedure

Prior to the ash determination, the sample was thoroughly dried. The moisture-free material was ashed in accordance with TAPPI Procedure T 413-40.

Chloride Ion Determination

The chloride ion concentration of the beaters was determined by filtering effluent liquor from the fibrous mass and insoluble material, and titrating the filtrate with N/71 silver nitrate using a saturated solution of potassium chromate as an indicator. The results were reported as parts per million of chloride ion.

Brightness Determination

Preparation of Handsheets

Apparatus

1. Hamilton Beach food mixer—Model B
2. Hamilton Beach No. 18 malted milk mixer
3. Friction drive agitator—Central Scientific Company, 1/12 hp. motor
4. Noble and Wood sheet machine

Reagents

1. 12% Iron-free alum solution
2. Distilled water

Procedure: Take the sample as submitted and, if it is higher than 4% consistency, dilute to 4% with distilled water; if lower, screen out the stock to about 4% consistency. Save all the liquor.

Defiber 400 gram portions of the 4% consistency stock in a Hamilton Beach malted milk mixer for 10 minutes. After all the sample has been defibered, pour back any liquor that had been removed before defibering and agitate the whole sample thoroughly. For this operation employ the friction drive agitator using a 3-inch (three) blade propeller at a slow speed for low consistency stock or the Hamilton Beach food mixer on speed 1 for stock 4% consistency and higher. Continue this agitation while taking enough of the sample to make a 10 to 15 gram sheet. Take no less than ten representative portions of the sample for each sheet and make three sheets from each sample submitted.

For each sheet, add sufficient iron-free alum solution (12%) to regulate the *p*H to approximately 4.5 to 5.0. After agitating mildly for 2 minutes, make a rough check on the *p*H. Agitate 8 minutes longer and accurately check the *p*H. It should be within the specified 4.5 to 5.0.

While the stock is being agitated for 10 minutes, prepare the deckle box of the Noble and Wood sheet machine as follows: Clean the deckle box thoroughly, being certain all the dirty water is out of the drain pipe below the box. Select and place a clean, flat screen on the deckle box. Run water up through the screen for at least a minute, then close the deckle box and adjust the water in the drain to the level of the screen.

After the stock has been agitated the proper time and adjusted to the correct *p*H, pour the stock into the deckle box and dilute with distilled water to 0.5% consistency. Agitate 20 times using the regular deckle box plunger. Draw off the water and wait 2 minutes before opening the box and removing the screen in order to allow ample time for the water to be drawn out of the fibers.

Allowing the sheet to remain on the screen, remove both and pass them through the press between clean felts. Number the sheet.

Next pass both screen and sheet through the dryer (214 Fahr.), first with the felt side toward the cylinder then with the screen toward the cylinder.

Remove the sheet from the screen and place in an envelope until cut and tested. Cut 1-inch strips from the four sides of the sheet; discard these; then cut the remaining 6-inch square into four 3-inch squares.

Prepare handsheets as described above and measure the G. E. brightness of each of the twelve squares. Brightness should be identical on felt and wire sides. The individual determinations should check within 7% brightness. Report average of twelve readings as brightness of stock.

Thoroughly Washed Samples

Preparation of the stock for handsheets representing the inherent brightness of the pulp was accomplished by an accelerated washing procedure. Approximately 100 grams of stock was placed in a 60-mesh screen and washed for a period of 15 minutes with a rapid stream of tap water running through it while the pulp was agitated by hand. The water drained from the pulp should run clear for the last 5 minutes of this procedure.

Brightness Measurement: Brightness measurements were made on a G. E. Brightness Tester. The procedure followed was that outlined in the General Electric pamphlet "Instruction for Using the General Electric Reflectance Meter (Brightness Tester)—April 1937."

THEORETICAL WASHING RATE

As a cross sectional segment of the contents of the beater washer travels past the fresh water inlet it is diluted. After passing under the beater roll it can be presumed that the composition of the segment is uniform. The segment, upon passing under the octagonal washer screen loses an amount of water equivalent to the dilution water previously added, thus resuming its original volume. This results in a partial displacement of the original contents of the segment, the magnitude of which can be represented by the following ratio:

$$\text{Fractional Displacement} = \frac{\text{Quantity of wash water added to segment}}{\text{Quantity of water present in segment after dilution}}$$

In terms of measurable variables associated with the Hollander washer beater this relationship can be expressed:

$$Q = \frac{W}{W + ALD\,(1 - C)} \qquad \text{.....(1)}$$

where:

Q = Fractional displacement of segment
W = Weight of washwater added to segment
A = Cross sectional area of segment
L = Length of the segment
D = Density of stock
C = Consistency of stock

For the purpose of analysis, therefore, the action upon this segment can be considered as a displacement of definite magnitude. Upon expanding the size of the segment to embrace the entire contents of the beater, it will be apparent that such a dilution and concentration takes place for each complete cycle of the contents of the beater. Hence, the volume of the segment becomes the volume of stock in the beater and equation (1) becomes:

$$Q = \frac{W_c}{W_c + V\,(1 - C)} \qquad \text{.....(2)}$$

where:

Q = Fractional displacement per cycle
W_c = Weight of washwater added per cycle
V = Weight of beater contents

The analyses involved in studying a Hollander washer beater are conveniently handled by expressing the fractional displacement in terms of the fraction remaining of the original volume. The fraction remaining after the first complete washing cycle may be expressed as:

$$S_1 = (1 - Q) \qquad \text{.....(3)}$$

where:

S_1 = Fractional part remaining of the original contents in the beater after the initial cycle
Q = Fractional displacement

The fraction remaining in the washer beater after a washing period consisting of (n) complete washing cycles may be represented:

$$S = (1 - Q)^n \qquad \text{.....(4)}$$

or

$$S = (1 - Q)^{yt} \qquad \text{.....(5)}$$

where:

S = Fractional part remaining of the original contents in the beater
n = Number of washing cycles
t = Time in minutes
y = Number of cycles per minute

Determination of the cycling rate (y), which is necessary in order to use equation (5), requires measurement of the average velocity of the stock in the beater washer. Because of the nature of the pulp

slurry and the geometry of the beater itself, it is difficult to make this measurement with precision. This necessity has been obviated by substituting the fractional displacement per minute (X) for fractional displacement per cycle and time (t) for number of cycles (yt) in equation (5).

$$X = \frac{R}{R + V(1 - C)} \quad \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

where:

X = Fractional displacement per minute
R = Weight of washwater added per minute

Hence,

$$S = (1 - X)^t \quad \ldots\ldots\ldots\ldots\ldots\ldots (7)$$

and

$$X = 1 - S^{1/t} \quad \ldots\ldots\ldots\ldots\ldots\ldots (8)$$

Although equation (8) is only an approximation of equation (5), it can be shown that, when the rate of cycling (y) varies from 0.5 to 2.0 cycles per minute, the use of this approximation introduces an error of less than 1.5% into the calculations. Since the use of equation (8) in place of equation (5) simplifies considerably the handling of the data collected during this investigation without detracting from the precision of the results, the approximate relationship has been used throughout this work.

It was originally thought that once the theoretical performance of a washer had been established by the means outlined above, this value could be used as a basis for all subsequent evaluations of the actual performance of that washer. However, it was found in practice that the theoretical performance of a washer was subject to considerable variation from one run to another. Since theoretical washer performance is a function only of rate of washwater flow and quantity of water in the beater, it follows that one or both of these factors varied from run to run. Specific operating variables which contribute to this variation include stock consistency, cleanliness of the screens, screen displacement, etc. It was, therefore, obviously necessary to determine (X) for each trial by one of the methods described above. In this case the chloride ion procedure was used since it required less attention and was better adapted to the facilities which happened to be available.

By introducing the efficiency factor (K) into equation (8), the following relationship for actual washer performance is obtained:

$$KX = 1 - S^{1/t} \quad \ldots\ldots\ldots\ldots\ldots\ldots (9)$$

where:

K = Efficiency factor
X = Displacement ratio per minute
S = Fraction of undesirable impurities remaining at time (t)

The practical application of equation (9) necessitates measurement of the rate of change in concentration of the undesirable impurities during washing in terms of some measurable property of the impurities. Two criteria are at once apparent: (1) brightness improvement and (2) ash reduction. In utilizing brightness measurements for evaluating changes in concentration of undesirable impurities, it is necessary to determine (1) the brightness of the stock before washing (initial brightness), and (2) the brightness of the stock at test points during the operation (temporary brightness), and (3) the brightness of the stock after washing until no further measurable change is effected (inherent brightness).

Six trial runs were made measuring the change in ash content and the change in brightness of stock during a washing period of commercial duration.

In accordance with expectations, the G.E. brightness of the stock continued to increase throughout the entire washing period. At the end of the commercial washing, the stock had not been washed to its inherent brightness but in general approached its inherent brightness approximately 65%. The values for actual washer performance (KX) were lower than the values for theoretical washer performance (X), as was expected.

The change in ash content during washing is conversely similar to the change in brightness during the washing period. The ash content was reduced during commercial washing to a value approximately 25% of the initial ash. It is interesting to observe that the inherent ash content of old paper stock remained reasonably constant at approximately 1% for all six trial runs. Again the values for actual beater performance (KX) were lower than the theoretical beater performance (X). The data obtained for actual beater performance based upon ash also vary somewhat as washing progresses, but the variation is less than in the data based on brightness. The greater uniformity of values for washer performance as measured by ash removal is probably because of the greater precision of the ash determination.

Ten trial runs were evaluated for washing efficiency (K) by determining the theoretical beater performance (X) utilizing the chloride ion method previously discussed and the actual beater performance (KX) utilizing brightness and ash changes during the washing period.

The stock furnished to the beaters, which contained all the undesirable impurities originally present in the waste paper, ranged in brightness from 29.3 to 39.7. After washing 120 minutes in the Hollander washer beater the brightness of the stock ranged from 40.0 to 46.4. The inherent brightness varied from 48.5 to 54.2. The initial ash content varied from 13.7 to 22.2% for the different trial runs. The temporary ash content after a 120-minute washing period varied from 5.7 to 10.1%, while an inherent ash content of 1% (average of values) was used.

The variations in brightness and ash are caused in part to variations in the composition of the old paper stock and in part to chemical modifications which were made in the cookers for reasons beyond the scope of this paper.

Since it is the object of this report to present a quantitative method for evaluating the washing efficiency of a Hollander washer, it is not within the scope of this report to interpret the interesting phenomena observed with respect to factors affecting the efficiency of the Hollander washer. Attention might well be directed to the possibility of manipulating these factors so as to achieve a substantial increase in washing efficiency from the present level of approximately 35%. Any improvements in washing efficiency would, of course, directly affect such items as washwater consumption, equipment capacity, processing time, and waste disposal. Although this study has been confined to the Hollander washer beater, the method of analysis which has been employed could be adapted to a quantitative study of other types of washing equipment.

The Ring Type Hydro Barker

JOSEPH E. HOLVECK
Worthington Pump and Machinery Corp.

A recent achievement in the timber industry has been the development of direct hydraulic application for the removal of bark from logs.

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In the pulpwood division of the industry, this development has effected savings up to 20 per cent in the cost of wood depending upon the quality of the pulp being manufactured and existing methods of removing the bark.

In the lumber division of the industry, hydraulic barking also claims advantages of upgrading the product of the lumber-eliminating waste, and reducing labor.

The ring type hydraulic barker developed in collaboration with the engineers of the Soundview Pulp Company, Everett, Washington, was designed primarily for the large production of 40,000 to 50,000 board feet per hour and for logs up to 60 inches diameter and 20 to 32 feet in length.

While the type of barker described in this paper applies mainly to the large logs encountered on the West coast, many of the same principles are being utilized in a small log barker now being built. This new barker is designed to meet the requirements of the pulp industry east of the Rockies where smaller diameter timber prevails.

Basically the barker offers a ring and nozzle assembly made up of three equal 120 degree segments. The log to be barked is conveyed through the center of the ring in a longitudinal nonrotating manner. The bottom segment is stationary conforming to the relatively constant under surface of all sizes of logs conveyed through the ring. The other two segments, right hand and left hand, are movable radially and provide for adjustment of the complete ring to conform to various sizes of logs up to 60 inches or more in diameter.

The positioning of the right hand and left hand segments is such that the relationship of each segment with its assembly of nozzles, as to distance and jet pattern to the log surface, is the same for all three segments and for all log diameters.

Movement of each of the two segments is obtained hydraulically by means of the pressure in the barking system and controlled through a common hydraulic valve. To insure equalized and synchronous motion and positioning of both segments an arrangement of steel cables interconnected through sheaves is utilized.

Positioning of the movable segments is also accomplished electrically by a master switch lever. The movement of this lever to any given log size indicated automatically causes the segments to assume the correct position for that particular log. Segments may be moved freely with nozzles open or closed.

There are 36 nozzles in the ring assembly, each nozzle is integral with a valve and the flow through the valves and nozzles is automatically controlled. The number of nozzles in action is always proportionate to the diameter of the log barked and only the necessary number of nozzles, required for complete coverage of the surface of the log, are used. The required nozzles are selected electrically by means of another master switch. The operation of this drum switch is accomplished mechanically by attachment to the movable right hand segment.

The flow of water through the nozzles is controlled electrically by maintaining finger pressure on the trigger switch mounted on a third master switch lever. The nozzles are open and high pressure water flows only during the time the log passes through the barking ring, which feature, in conjunction with the qualified number of effective nozzles used, conserves water and power. The control and operation of the spray valves is such that their opening and closing is free from detrimental shock to the hydraulic system.

The hydraulic barker achieves complete barking of all logs up to 36 inches diameter in one pass. Logs above 36 inches and up to 72 inches diameter require two passes. Since the number of logs in these large sizes comprises only a small percentage of the normal run of logs, it is more economical from the standpoint of machine design to utilize the two-pass arrangement. Because of the relative larger volume of wood in these big logs, ample time is available for the additional period required for complete barking. This particular operation requires that these extreme sizes be rotated 60 degrees between the first and second passes. A rotating device is provided for this purpose and installed in the entry conveyor rolls. The log rotator is manipulated by a foot switch and is also employed to position abnormal logs for more favorable longitudinal conveyance through the barker. The rotator comprises two pairs of rotating trunnions located in the entry conveyor roll assembly which are moved into engagement with the log, when required by means of air cylinders.

An equal number of jets in all segments is always applied and their combined action is such that the resultant forces produced by their impingement on the log are balanced both radially and rotatively. However, abnormal logs have a slight tendency to unbalance these forces and for this purpose two press rollers, one on each side of the ring, are used to counteract this inclination. Each press roller consists of two large truck tires sufficiently weighted and also slightly spread so as to straddle the log. The movement of these press rollers is also synchronized with the positioning of the movable segments allowing the tires to automatically roll freely on top of the log.

The barker, though originally developed and designed for a pulp mill, was also projected to answer the requirements of the timber division as well. This primarily called for a barker capable of removing bark from logs of any length from 16 feet up to 60 feet or more.

For large diameter logs, the method of applying the hydraulic jets involved the following other equally important considerations:

(a) adherence to the practical application of hydraulics; (b) avoidance of special log handling necessitating complicated machinery and incidental maintenance; and (c) harmonizing the conveyance through the barker, conforming to standard wood mill practice.

The barker meets all these qualifications in the removal of bark.

Since the quantity and rate of high pressure water for thorough barking varies directly as the diameter, the hydraulic supply system must also vary. This calls for a hydraulic generating plant capable of meeting this variable demand and for this purpose an accumulator is used.

The accumulator in conjunction with the shut off spray valves enable the selection of the pumps, based on the average demand, thereby avoiding pumps of excessive capacity and eliminating peak power demands. In this installation peak water demands of as high as 250 per cent may be encountered and which are ironed out by the accumulator. This enables the selection of pumps and connecting motors to be based on the average and not the peak demand. Excessive generating capacity in the pulp mill power plant is avoided, or with purchased power, peak electrical demands are eliminated.

The barker is contained in a steel sealed chamber with baffled entry and delivery openings for the logs, and drainage opening in the bottom for the expended water and loose bark.

The central hydraulic generating plant for the Soundview mill was selected for a barking demand of a minimum of 40,000 board feet per hour and for an average log of 18 inches top diameter. To meet these specifications, an average flow of approximately 1500 gpm is required at an average pressure of 1150 psi. Two pumps were installed, each having this capacity, thereby providing for 100 per cent over capacity to meet variable operating conditions. Each pump is powered by a 1250-hp motor and with present water supply conditions requires an input for this average demand of 875 kw per pump.

Normal logs are barked at an average speed of 180 feet per minute and provision is made in the conveyor controller for a lower or higher speed depending upon the nature of the bark.

The new wood mill for this plant has not yet been completed nor has the new 150-inch chipper been installed. All the logs now barked are passed through the old mill to the present chippers, thereby limiting the capacity of the barker and requiring 24 hours per day operation. For the present, therefore, the barker plant is required to operate inefficiently from a power standpoint and will continue under these conditions until the new chipper is installed the early part of the present year.

In the final operation, this installation will bark the required 500,000 board feet per day in 12 to 16 hours.

The present operating situation precludes accurate working data at this time. However, since the barker was started early in September, sufficient knowledge has been acquired to substantiate its economical value in the pulp and timber industry.

Acknowledgment

The author acknowledges the work of Messrs. Leo S. Burdon and J. H. McCarthy of the Soundview Pulp Company and expresses appreciation for their assistance and collaboration in the development of this Worthington Hydro Barker (patent applied for).

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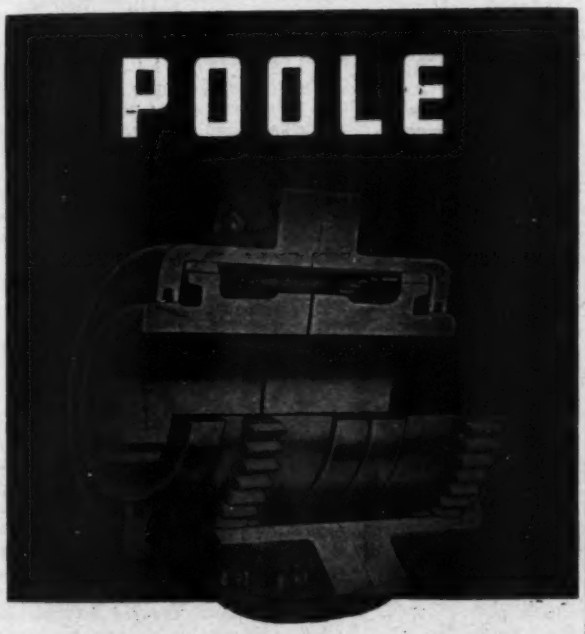

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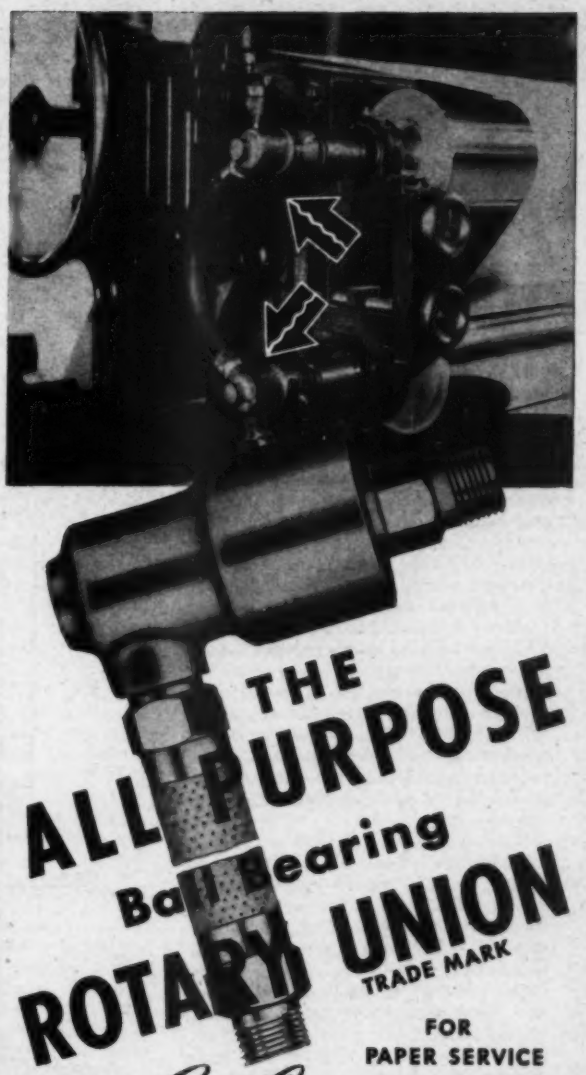

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Washing of Deinked Stock —Results of Sodium Hexametaphosphate Treatment

H. P. BAILEY, Manager
A. H. NADELMAN, Chemist
International Paper Company

It was the object of this investigation to improve the continuity of production of washed deinked book and magazine stock. The continuity of operation of the washers for unbleached deinked stock was impaired by copious formation of scale. Figure 1 shows the layout of the washer system.

The unbleached deinked stock is washed on five cylinder unit washers.

The effluent of the second to fifth cylinders is re-used in the headbox preceding the riffler. The washed stock is bleached by means of calcium hypochlorite, screened, and rewashed on two cylinder rewashers. The shower water of the rewashers comes from the mill's filtration plant. The total system consists of several five cylinder unit washers for unbleached stock and two cylinder unit rewashers for bleached stock. The effluent of the rewashers is discharged into a joint header preceding a pump which serves the showers of the washers for unbleached stock as well as the screen showers.

Inspection of the layout of the washer system reveals that there are three sources of scale forming material, namely, blow chest liquor, bleach chest liquor, and fresh water.

Blow chest liquor contains a considerable quantity of sodium hydroxide and sodium carbonate; this is due to the fact that the deinking process requires alkali in excess of the quantity which is consumed by the waste paper stock. The excess seems to be necessary since the deinking process becomes incomplete and slow below a certain minimum concentration of alkali.

Bleach chest liquor contains large quantities of calcium chloride in addition to other water soluble products formed during the bleaching of book and magazine stock with calcium hypochlorite. The bleach chest liquor may contain more than 1000 ppm permanent hardness expressed in terms of calcium carbonate.

Repeated analyses of representative samples of fresh water show that the total hardness varies within the range of 100 to 120 ppm.

The shower water of the washers for unbleached deinked stock represents a mixture of bleach chest liquor and fresh water. The total hardness of the shower water amounts to about 350 ppm.

It is evident that the presence of an excess of caustic and carbonate alkalinity results in precipitation of water soluble calcium and magnesium salts. Calculations based on analyses show that between 6000 and 10,000 pounds of soluble calcium and magnesium salts enter the washer system during a day's production run.

Experience has shown that a part of the precipitated carbonates forms hard deposits of scale which clogs the wires of the cylinder washers, covers the doctor boards as well as doctor blades, fills up drain pipes, and clogs pumps. Interruption of production is unavoidable as long as the scale has to be removed by means of hydrochloric acid or other methods. While the scale is dissolved by the acid, its use is very cumbersome due to unpleasant acid fumes. Furthermore, the use of hydrochloric acid requires utmost care and safety measures to prevent serious burns. Finally, excessive use of acid corrodes the wires, spiders, and other metal parts of the washers, and destroys the collar bands, which are so important to hold fiber losses at a minimum.

Desiring to prevent or inhibit formation of scale on the washers, several chemicals were tried in the laboratory in conjunction with samples of clarified alkaline blow chest liquor and shower water containing 350 ppm hardness.

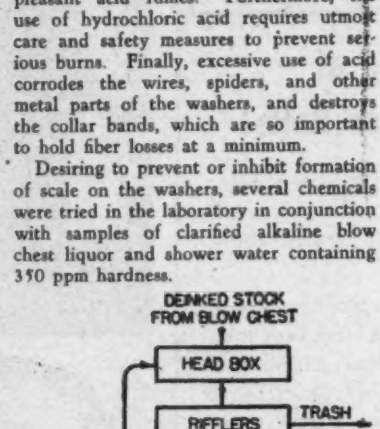

Figure 1

Experiments showed that the visible precipitation of insoluble carbonates from blow chest liquor by means of high calcium shower water was delayed by 5 ppm of sodium hexametaphosphate for more than 30 minutes. This was true even after inoculation of the mixture with a small quantity of calcium carbonate crystals. After 30 minutes, a precipitate could be observed which was fundamentally different from the one formed in mixtures without sodium hexametaphosphate. The precipitate in the mixture treated with sodium hexametaphosphate formed fluffy, voluminous flocs which did not cling to the wall of the container, settled rapidly, and left the supernatant liquor clear and transparent. Without the sodium hexametaphosphate treatment, a fine precipitate was obtained relatively quickly. Due to slow and incomplete sedimentation, the liquor remained turbid even after 16 hours. The sediment clung to the walls of the glass container.

Encouraged by the results of the laboratory experiments, it was decided to make a trial run in the mill over a period of 1 week. A slightly alkaline solution of sodium hexametaphosphate was fed continuously by gravity into the effluent of the rewashers. The rate of flow was adjusted to yield 4 ppm of sodium hexametaphosphate in the shower water. Determinations of sodium hexametaphosphate were run colorimetrically. A modification of the Truog and Meyer (*Ind. Eng. Chem., Anal. Ed.* 1, No. 3: 136-139, 1929) method was employed.

The sodium hexametaphosphate treatment resulted in a remarkable stoppage of scale deposition and, consequently, in a decrease of shut-downs of the washers.

In addition to the prevention of scale formation, the sodium hexametaphosphate removed old scale deposits. The surface of the scale on the doctor blades and boards of the washers became porous and brittle, a gradual reduction of the thickness of the layer of scale took place.

After the promising trial run, it was decided to install a permanent system for sodium hexametaphosphate treatment. A stainless steel constant rate feeding pump with adjustable stroke injects the solution of the chemical into the shower water at a point marked "A" in Figure 1. The rate of feeding has been adjusted so as to yield 2 to 3 ppm of sodium hexametaphosphate in the water.

Several months' experience has taught that it is possible to inhibit or prevent formation of scale on the washers. Interruptions of production due to scale deposits are practically eliminated. Scale on doctor blades, doctor boards, and other places has vanished.

The cost of sodium hexametaphosphate plus royalty is less than the amount spent on hydrochloric acid before the water treatment was started. The cost of maintenance of the washers has decreased to a considerable extent. The life expectancy of collar bands, spiders, and cylinder wires is longer than ever, due to the fact that acid is practically eliminated.

Future Trends in Requirements By Users of Printing

W. C. HUEBNER
Huebner Laboratories

The overall picture of the printing industry as of today reveals complicated procedures tied to deeply rooted traditions and practices. It shows great varieties of specialized printing equipment and a tremendous investment in so-called orthodox equipment with technical bottlenecks that defy change because of interdependent procedures and equipment.

The craftsmen engaged in letterpress, offset, and gravure branches are similarly set and grooved in the operation of their equipment according to its technical procedures. None has provided for future growth in adequate apprentice training to supply the needed manpower to function efficiently.

The time is now for beginning a new printing industry with a new approach to by-pass the technical bottlenecks of ortho-

dox three-group equipments and procedures.

The new start in printing can be made in a practical way without upsetting the present day operations on any existing plant or its personnel, or throwing a single operator out of work.

Since the beginning of printing, *pressure* has always been and is now employed in all forms of printing presses to transfer a thin film of ink, pigment or dyes, from the printing areas to the print-receiving materials.

The use of pressure in all orthodox printing will always be compulsory because the concept of printing in all its subsequent applications is based on the accepted and fully understood fact that pressure is a primary requirement to lift the ink from a printing plate to the paper.

Thus printing means impression and impression means pressure.

The use of pressure in printing adds up to the following:

1. Heavy, costly presses are needed for each separate printing process: relief, gravure, offset, textiles, and metals, to meet *printing pressure* requirements.
2. Make-ready and consequent lost time in press edition production
3. Friction and wear on plates and forms
4. Misregister and registration difficulties where a multiplicity of plates, flat or curved, must be mounted and registered in flat forms or upon press cylinders
5. Printing difficulties and limitations to practical printing materials
6. Offsetting and ink drying troubles.
7. Costs in time and dollars on trouble shooting during production periods
8. Cumulative delays and bottlenecks in preparatory work
9. Plate making, form makeup, curved color plate assembly on cylinder form registration
10. Duplicates or molded separate plates to make up a form for relief printing
11. Quality losses and variables in printed editions
12. Time and costs of all reproduction work from the copy to the press forms ready to print

With the demand for greater speed in printing, webs and sheets were fed into faster presses at corresponding paces. Press room trouble then appeared, known as effects from static electricity, which caused paper to curl, wrinkle, or stick together. It caused ink to vaporize and float in the air and pile upon opposite polarity surfaces. It also caused the ink printed on top of one sheet to offset to the bottom of the sheet delivered over it on the delivery pile. It attracts to the surface of the web or sheet dust and dirt particles and causes mottling of the printed image.

It is one of the primary causes of press room waste.

Close observation of static offsetting in offset press rooms led to tests which proved conclusively that ink can be discharged from many materials and attracted to paper when positive and negative polarities are known and controlled. As a result, ink can always be caused to leap across a space of several inches between the ink-holding material and the sheet of paper. This principle can be successfully demonstrated by anyone using the proper materials, by creating friction static charges upon film and paper, and by using correct polarities on the sheet of paper to attract the ink.

This discovery of controlled polarities of static charges led to research work over a period of twenty years. Tests have resulted in the use of electronic current generated from an alternating current power line, sent through transformers and then through electronic tubes, creating a flow of direct current electrons. Thus by the use of correct polarities applied by two separate circuits in a new cylinder press designed for the purpose, quality printing is *obtained without pressure*, using any practical printing image or texts method and produce better printing upon any commercially required material.

It must not be assumed from the foregoing statements that in electronographic printing the ink from the image flies through a wide space, because in demonstrating the principle of ink discharge by static attraction and repulsion above referred to observations may lead to the erroneous conclusion that a large space or gap exists across which the ink must discharge from the inked images to the paper, as *printing without contact*, because this is not a desirable or practical condition for all electronographic printing.

The practical space or gap between the surface of the uninked image carrier and the paper to be printed upon may be about 0.001 inch. The two surfaces may actually touch or contact in various places, but no pressure whatsoever is used.

If the space setting between two cylinders is widened, higher voltages are needed for ink transfer, and if carried too far result in coronas and arcings which are not desirable or practical and certainly are not needed.

Because of uneven thickness of paper stock, the paper will not space evenly between the inked image surface and the paper supporting cylinders when the cylinder and paper space relationship is set in the press. Thicker portions of the stock, however, may actually contact the ink image surface without the slightest pressure, and yet fine, sharp uniform printing will result without friction or wear.

When the image is inked, however, and the current is on, with correct polarity relations, the ink on the image bulges toward the paper, and if the paper is loose it will rise to meet the ink or image surface. As the voltage is raised the ink is transferred to the paper; thus there is the instant of contact during the instant of ink transfer.

If no electrical current is turned on and all static charges on image surface and paper are removed by complete grounding, no overall ink transfer or printing is attained because no printing pressure exists. Contacting ink spots or areas will obviously show, but no overall uniform printing is possible.

When the printing circuits are turned on, two important functions are set in motion. The first current circuit is directed at the inked image surface during cylinder rotation—from discharge terminals. The terminal is so placed that the ink on the image is *ionized* and charged with negative current electrons. The positive side of the first circuit terminal is used to precharge the surface of the paper, so that the ink is attracted to the surface of the paper at the usual printing line between two cylinders. This first circuit is named the *precharge circuit*.

The second current circuit is placed inside the cylinder and functions through two blades. The first blade is housed

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between two heavy insulators to direct the discharge of electrons to the sharp edge of the blade which is clear of contact from the inside wall of the image carrier cylinder or tube, but positioned in line of the usual contact point between two revolving cylinders.

The second blade is similarly housed inside the paper carrier cylinder or tube. The edges of the two blades face each other and are parallel for the inside length or width of each cylinder. The space relationship between the edges of the two blades is set at a point suitable for a maximum voltage to be used.

When this second circuit is turned on, its negative polarity discharges electrons toward the positive polarity blade edge, and transfers the ionized ink images passing between the two blades to the paper which also passes between the blades in timed surface speed with the travel of the image surface. Thus the second circuit is named the *transfer circuit.*

Observation of tests discloses the following facts: ink on the image surface actually bulges toward the paper surface, and the paper surface moves toward the inked surface if the paper is free to move.

During correct printing relationship the paper is obviously held against movement on the surface of its carrier cylinder. It is under this condition that the ink is transferred to the paper for quality of image sharpness of edges, and for exact register in color work.

The voltages used are comparatively low for so-called high potential currents. Excellent results are attained with voltages as low as 6500 on the transfer circuit and around 8500 on the precharge circuit. These voltages vary according to the materials employed for the cylinders, ink, and paper.

The higher the voltage, the greater must be the distance between the blade edge terminals to prevent coronas and arcings. Long periods of tests show conclusively that low voltages properly spaced and controlled give best results under average working conditions.

When the polarities on the paper are controlled in correct relationship to the polarity of charge on the inked image, ink transfer from the image to the paper web is accomplished without pressure and without assistance from the direct electronic current.

After the web receives the ink image it is passed over discharge rollers where the static on both surfaces of the web is removed or grounded after serving the useful purpose in printing without pressure.

The static voltage before grounding is controlled by gap terminals whereby the useful voltage builds up to the limit set. However, the application of generated direct electronic current is used because electronic tubes provide a steady flow of released electrons needed for uniform results, whereas static charges build up voltage until it spills over at the spaced ground points but with complete discharge, after which it builds up again. Thus intensity variations occur which are not desirable.

In addition, the intensity of static is affected by atmospheric moisture. Therefore, electronic current with steady flow and controlled voltages is the practical force used in electronography.

The electronographic press serves the users of printing because electrons are released to ionize ink images, to control electric surface charges heretofore troublesome, to perform a useful function in printing, and by the final transfer line of force, produce a printed result more useful, more flexible, and more economical, because printing can be done better without make-ready and without pressure.

Use of Paperboard as a Sorptive Material in Protective Packaging

R. C. RIETZ and L. O. ANDERSON
Engineers, Forest Products Laboratory*

Protective packaging techniques were considerably improved during the war period, because of the need for greater assurance that the armed forces would receive serviceable equipment and replacement parts. The objectives of protective packaging were clearly defined during this period and packaging methods and packaging materials were developed at the Forest Products Laboratory and elsewhere. The method II pack employing an impervious moisture vapor barrier and a desiccant to provide corrosion control by the maintenance of a low relative humidity within the pack has received its due share of publicity. Another method of packaging was developed during the war period which can well be given considerable scrutiny because of the promise that it has for postwar packaging. This is method IA pack.

The method IA packaging technique is used when the corrosion-preventive compound on the critical item or surfaces definitely needs help to enable it to do its duty. The packaging materials not only must keep the preservative compound where it belongs, but in addition they must keep out water and corrosive atmospheres. Both greaseproof wrappers and water barriers are used but the use of a water barrier characterizes this method of packaging.

The method IA-2 pack is a nonconforming IA pack. By nonconforming is meant that the water barrier is usually placed around the unit container rather than around the part or item as is done in the method IA-1 or the so-called conforming pack. Early studies indicated that the expansion and contraction of the trapped air within a method IA-2 pack, because of temperature changes, would eventually result in the failure of the water barrier. Thus, the conforming method IA-1 pack was recommended as the more desirable practice where the nature of the item permitted. Field experience indicated that this pack was not performing according to expectations whereas the nonconforming pack was giving superior performance in spite of the entrapment of air within the package.

This called for a check of field experience against laboratory tests to determine, if possible, the causes of such contradictory package performance. Laboratory studies have confirmed field experience in that the method IA-1, or conforming pack, did not provide protection as good as the method IA-2, or nonforming pack. The next problem was to find out why.

Although method IA packs do not contain desiccants, the IA-2 pack does contain sorptive material in the form of paperboard used for cartonizing the item. It is believed that the presence of this sorptive material accounts for the superior performance of this method of packaging.

To obtain evidence that the sorptive materials in the method IA-2 pack are

(*) Forest Service, United States Department of Agriculture; Maintained at Madison, Wis., in co-operation with the University of Wisconsin.

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influential in preventing an accelerated breakdown of the corrosion-preventive compounds used in method IA packaging, an experiment was conducted that incorporated both method IA-1 and method IA-2 packages with and without ruptured water barriers. The test specimen was a steel rod 5 inches long with 3 inches of its length turned to 1⅜ inches in diameter, and ground to a fine finish and the remaining 2 inches of the rod machined to a diameter of 1¼ inches. The rods were cleaned and then washed in methyl alcohol to remove perspiration residues. They were then treated with a corrosion-preventive compound, wrapped in a grade A greaseproof wrapper and then packaged in accordance with method IA-1 or IA-2 procedures.

The study included the following variables:

A. Corrosion-preventive compounds

1. None

2. U. S. Army Specification 2-122 compound

3. U. S. Army Specification 2-82 compound

B. Packaging methods

1. Method IA-1

2. Method IA-2

C. Water barriers

1. Grade C type 1 greaseproof wrapper, wax dipped

2. Water barrier with moderately low moisture-vapor transmission rate (1.6 grams per 100 square inches per 24 hours at 100 Fahr. and a moisture vapor pressure differential of 43 mm. of mercury)—heat sealed

3. Water barrier with low moisture vapor transmission (0.05 gram per 100 square inches per 24 hours at 100 Fahr. and a moisture vapor pressure differential of 43 mm. of mercury)—heat sealed

D. Barrier closures

1. Good—fully sealed by wax dipping or heat sealing

2. Ruptured—small hole cut in sealed barrier

E. Exposure without rough handling

1. Standard 8-day cycle repeated once

2. Standard 8-day cycle exposure followed by exposure to 120 Fahr. and 97% relative humidity for 6 days and to 40 Fahr. and 97% relative humidity for 1 day, continued for 4 weeks

3. Standard 8-day cycle exposure followed by exposure to 120 Fahr. and 97% relative humidity for 6 days and 40 Fahr. and 97% relative humidity for 1 day, continued for 8 weeks

The data collected in this experiment do not provide informaton to prove or disprove the suggested theory that sorptive materials are active in controlling corrosion, but the superiority of the method IA-2 pack in providing protection is demonstrated. A further correlation between the laboratory exposure tests and field results is needed to establish life expectancies of method IA-1 and method IA-2 packs.

If field experience and the results of laboratory experiments are acceptable as being indicative that sorptive materials definitely assist preservative compounds in preventinug corrosion, the more general use of the method IA-2 pack can be recommended with considerable assurance. The elimination of void space is less important than originally believed. More important is the introduction of a sorptive material within the package. This applies to all classifications of protective packaging.

Military supplies are still being procured. It is recommended that whenever method IA protective packaging is required that the IA-2 pack be specified in preference to method IA-1.

Protective packaging will find its place in postwar commercial packaging procedures and the importance of proper cleaning and the use of good corrosion-preventive compounds cannot be overstressed. Where extended shelf life is indicated, or where packaging for export is being undertaken, the findings from field and laboratory experience with military packaging are applicable. As previously stated, the presence of sorptive materials in all classifications of protective-packaging methods is believed beneficial. Therefore, whenever a water or moisture-vapor barrier is used, it is desirable to place it around the unit container so that the paperboard sorptive material is inside the package where it can do the most good. The method IA-1, or conforming, wrapping technique cannot be recommended as having postwar application.

NEW EQUIPMENT AND SUPPLIES

First-Aid Heat Block

Mine Safety Appliance Company, Braddock, Thomas and Meade St., Pittsburgh 8, Pa., has announced the *M. S. A. Redi-Heat Block* as a rapid and safe emergency source of heat for first-aid use. The device consists essentially of a block of lightweight metal with high heat transfer value, encased in a special cover and containing a replaceable heat charge. This

charge is in the form of a small, sealed metal cylinder containing a chemical compound. The chemical is activated by raising and releasing a spring-loaded lever, thus instantly creating a reaction which evolves safe, dry heat.

The block weighs only 22 ounces and measures 3½ inches x 4 in. x 1½ in. Wrapped in a towel or blanket, it maintains its temperature for approximately one hour.

Felt Washing Detergent

The Cowles Detergent Company, 7016 Euclid Ave., Cleveland 3, Ohio, has announced a paper mill felt washing detergent called *Nu-Nap*. Made in two grades —Nu-Nap for washing on the paper machine, and Nu-Nap Special for use on or off the machine—the product, completely anhydrous, is stated by the manufacturer to be equally effective in either hard or soft water—washing clean, rinsing freely, and leaving felt soft and absorbent. Nu-Nap is furnished in 400 lb. open head drums.

Plasticizing Resin

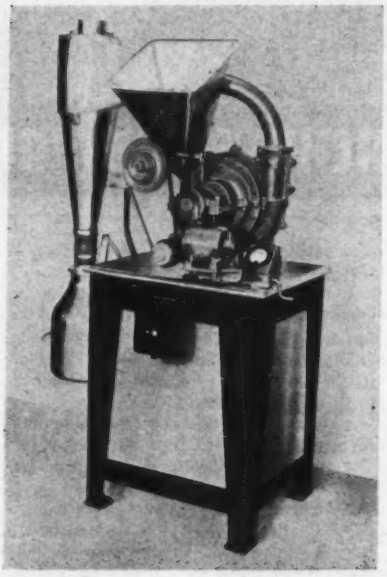
The Neville Company, Pittsburgh 25, Pa., has announced *Nevillac T S*, a new plasticizing resin having very little odor and good color retention. It is a clear amber, resinous oil with a vague phenol odor. It is very viscous and slow flowing; is soluble in practically all solvents except water, glycerine and higher polyhydric alcohols; is miscible with ethylene glycol and its di- and tri- derivatives; and is compatible with zein, cellulose derivatives, synthetic rubber, terpene, alkyd, phenolic, vinyl and coumarone-indene resins.

It has an average molecular weight of 250, a specific gravity at 30.0/15.6 deg. C. of approximately 1.08 and a refractive index at 25 C. of 1.599. Distillation is essentially above 300 C. with slow decomposition beginning at about 370 C.

According to the announcement, this chemical is an excellent compounding material to use with zein as it imparts waterproofness and lasting flexibility to it. The manufacturer also suggests it for waterproof and greaseproof paper coatings.

Pulverizer for Pilot Plant And Laboratory Work

A screenless pulverizer, with grinding capacities from five to 200 lb. per hour and capable of reductions to particle sizes in the one to 25 micron range, has been announced by the Pulverizing Machinery Co., Chatham Road, Summit, N. J. All parts of the pulverizer in contact with material being ground are 18-8 stainless steel with the exception of body castings which are high nickel-iron alloy, or other



machinable alloys for special applications. The pulverizer, designated as the *No. 5 Mikro-Atomizer*, uses a 5-hp. motor.

The material fed into the mill is first pulverized by rotating hammers, then carried by an air stream into a separator wheel whirling at 7,000 to 10,000 rpm. A fan adjacent to the separator wheel draws out and discharges the finest particles. The coarser particles drop back into the paths of the hammers where they are beaten and rebeaten until reduced sufficiently to yield to the pull of the fan.

Silicone Antifoam

Dow Corning Corporation, Midland, Michigan, has announced D C Antifoam A as a silicone antifoam agent developed especially for use against foam in aqueous solutions and emulsions. The product is a viscous compound which is translucent, colorless and tasteless. It is chemically inert, nonvolatile, and has a slight but not unpleasant odor.

It is insoluble in water or alcohol; is disperable in such solvents as benzene, carbon tetrachloride, toluene, and V.M. and P. naphtha; and, in many cases, it can be used as supplied. Emulsions can be prepared if necessary.

Laboratory tests as noted in the announcement cover two pulp and paper mill applications; namely, evaporation of alkaline black liquor and rosin soap solutions. These tests reveal that 70 parts of the defoaming agent per million are required for defoaming rosin soap solutions; that one part per million is required to defoam alkaline black liquor.

DC Antifoam A is available in one, ten, and 50 pound cans.

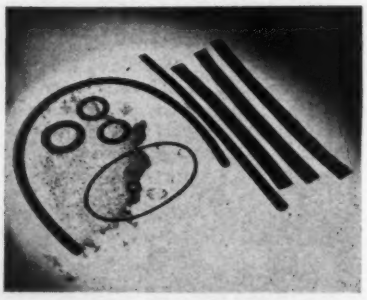
Menthylphenol

Menthylphenol, a terpene hydrocarbon, has been announced by Hercules Powder Company, Inc., Wilmington, Delaware, as being commercially available. According to the manufacturer, this chemical, a white opaque semiamorphous solid and known formerly as Stabilizer X, improxes the heat and light stability of ethyl cellulose plastics, film, adhesives and paper coatings.

The optimum amount of menthylphenol found useful with ethyl cellulose is one to three per cent based on total solids of the mix.

Silicone Rubber Gaskets

General Electric Co., Chemical Department, Pittsfield, Mass., has announced a line of silicone rubber gaskets for high temperature applications. Made in a variety of extruded shapes and sizes, includ-



ing round, square, flat and tubular, these gaskets, according to the announcement, will maintain resiliency after long exposures to high temperature—also they will not adhere to metal or any other material in spite of continued use at high temperatures and under oxidizing conditions.

Gravity Roller Conveyors

Lyon Metal Products, Inc., Aurora, Ill., has announced a line of gravity roller conveyors presently available in the following standard sizes—three straight sec-

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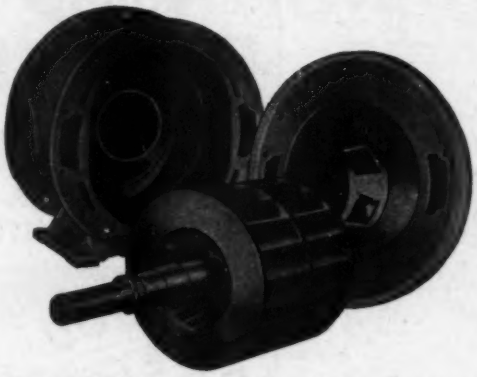

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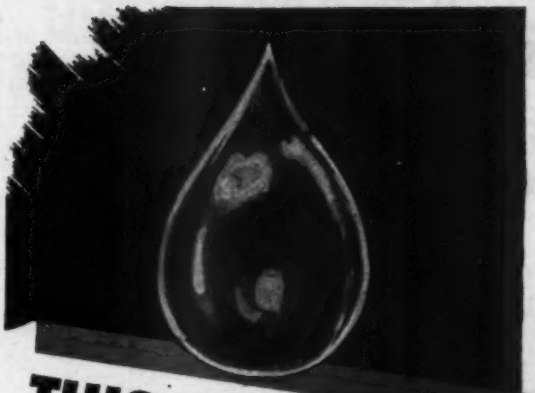

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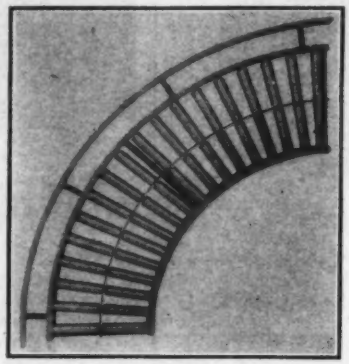
tions, all 10 ft. long and in three widths, 12, 18 and 24 in.; three 90 deg. curved sections, 12, 18, and 24 in. wide; two trestles, 18 and 24 in. wide. Each item is a complete unit, thus permitting combinations of several arrangements in straight runs and curves. Among the



features mentioned in the announcement are: small retainer channel just under top flange of frame rails covers ends of roller shafts; rollers mounted on full length shafts; rollers set slightly above level of tops of side rails; rollers fitted with ball bearings; units good for loads to 200 lb.

Felt Washing Compound

A felt washing compound, known as *Syntergent K*, has been announced by the National Oil Products Company, Harrison, N. J. This product is a light, amber-colored liquid that is cation-active. According to the announcement, it is extremely mild and has no detrimental effects on the felts.

Speed Selector

Speed Selector, Inc., Cleveland, Ohio, and The B. F. Goodrich Company, Akron, Ohio, have jointly announced the development of the *Variable-V-Planetary Speed Selector* in which two standard cross-section V-belts and four variable pitch pulleys provide infinite ratio, stepless speed from full down through zero and into full reverse at constant torque of two-horsepower capacity. Speeds from 400 rpm to zero, forward and reverse, can be obtained with the control. A hand wheel controls diameter of all four pulleys.

Other mechanical features include: aluminum frame, cast iron sheaves, prelubricated ball bearings, hardened shafts and other wearing parts, and natural ventilation created by revolving assembly inside aluminum housing.

Among the machine applications suggested in the announcement are: agitators, calenders, folding machines, hoists, lathes, printing presses, and pumps.

Temperature and Operation Recorders

Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, Pa., has announced a line of recorders for both temperature and operation applications. The temperature recorder is available in the following standard time-temperature ranges:

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24 hours, —10 to +50 deg. Fahr.; 24 hours, 30 to 60 deg. Fahr.; 24 hours, 40 to 100 deg. Fahr.; 24 hours, 70 to 130 deg. Fahr.; 24 hours, 60 to 90 deg. Fahr.; and 8 hours, 60 to 90 deg. Fahr. Two types of operation recorders are standard: Type D with 24 hour movement, and Type C with 8 hour movement.

Designed primarily as portable field service instruments, manufacturer suggests

the temperature recorder for ascertaining conditions of operation and performance of heating, space cooling and air conditioning devices and systems; the operation recorder, for making a record of the flow of current through any electrical device, such as motors, lamps, fans, signs, etc.

The line which features complete interchangeability is designated as *Tempscribe*.

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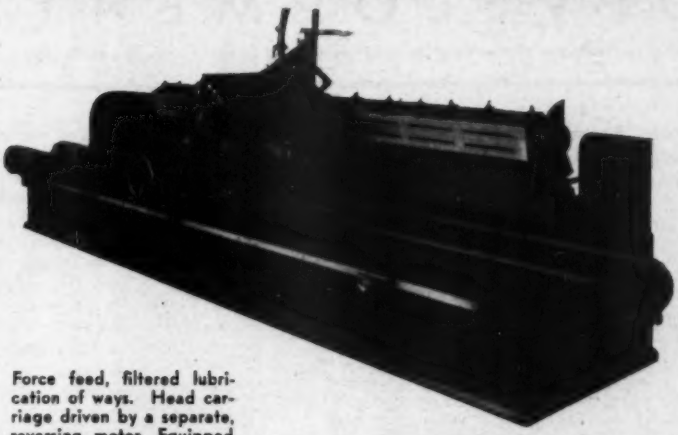

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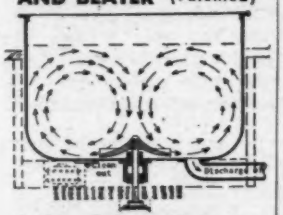

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Scale Formation in the Evaporation of Sulphite Waste Liquors

The two principal problems connected with successful evaporation of the waste liquors are the proper selection of construction materials and the elimination of scale deposits on heating surfaces. The first appears to be solved satisfactorily. Only recently has the scale problem been properly handled. The following factors influence the tendency of sulphite waste liquors to form scale deposits: (1) scale formers in the liquor, (2) action of the liquor as a protective colloid, (3) acidity, (4) percentage of suspended particles in the liquor, (5) the steam load of the heating surfaces, (6) temperature of the waste liquor, (7) the foaming of the liquor on the heating surfaces, (8) the period that the liquor remains in the evaporator, (9) the rate of travel of the liquor over the heating surfaces.

Precautions are given for obviating or reducing scale formation, and special reference is made to the Grewin-Lindberg system. This consists of a heat exchanger with identically sized channels and an arrangement for the separation of steam and liquor. After a certain period of operation, the flow of steam and liquor is reversed, thereby causing the condensate from the steam to dissolve the scale previously deposited by the liquor. The system is said to operate continuously, and time-out for cleaning, it is claimed, is no longer required. Carl Nyman. Svensk Papperstidn. 49, No. 4, 73-83 (1946). In Swedish with English summary. Through Bull. Inst. Paper Chemistry 16, 543 (1946).

Ground-Nut Protein in Paper Sizing

With the object of finding economies in the use of alum and rosin in sizing paper and board, the Forest Research Institute at Dehra Dun, India undertook a study of possible substitutes for either or both products.

Referring to Prosize developed by Rowland and Bain, a number of protein-bearing indigenous materials were experimented with, especially the groundnut (peanut) cake residues after oil extraction. The following sizes were prepared: free rosin-protein dispersions in the proportions of 1:7, 1:5, and 1:3; combined rosin-protein dispersion in the proportion of 1:5; free rosin "gronut" in the ratio of 1:5; combined rosin-gronut in the ratio of 1:5; sodium salt of proteins isolated from groundnut cake, and gronut size alone. The term "gronut" size refers to the alkaline extract of the groundnut cake (containing protein).

The experiments are fully described; tabulated data are given, and a sketch is given of the apparatus used for testing size resistance of paper and board. Gronut size alone is uneconomical. On the other hand, the use of the protein as such or in the form of gronut size can be used for the preparation of free rosin-protein dispersions, and the results are promising. For this purpose, the minimum requirements are 0.4% of the groundnut cake on the weight of pulp used. This replaces about 1% rosin and furthermore there is a 15-17% saving in alum. The equipment for size preparation is simple and relatively inexpensive.

In handmade papers, it is possible to use gronut size alone, provided such units can afford the cost of equipment. Sheets sized in this way can be air-dried, as usual in handpapermaking. Higher temperatures are required in drying sheets in which rosin protein dispersions have been used. Chattar Singh and Kartar Singh. Paper-Maker 111, No 1 Ts 6-10; (also Indian Forest Bull. no. 126 (1945) through Inst. Paper Chemistry 16, 538-9 (1946).

Utility of Aspen Wood

As one of the valuable sources of raw materials for the wood-using industries of the Lake States, aspen has its best possibility in large scale utilization in the paper industry. Co-operative efforts are required to develop low-cost production methods of logging, transportation, etc. Despite its inferior strength as a papermaking raw material and difficulty in barking, its cheapness, ease of pulping and bleaching, and high yields commend its use. It is particularly suited to the manufacture of dissolving pulps and printing papers. Recently aspen has been defibered mechanically and used as base filler for roofing, building, and insulating papers, floor coverings and other asphalt-containing papers. Certain grades of aspen that are now used in boxes, pulps or crates, are more valuable for the production of veneer bolts, furniture, or interior trim lumber. Hence, aspen should be graded and treated like high-quality hardwoods, and inferior species should no longer be marketed as aspen. Zigmund A. Zazada and W. A. Kluender. Chemurgic Digest 5, No. 11, 193-9 (1946).

Fungistatic Vapors for Control of Mold on Packages

Forty-seven different chemicals were tested for effectiveness of their vapor in controlling mold in closed containers. The tests were made in response to a demand for fungus inhibitors (especially in the tropics) for certain military supplies and equipment in which the preliminary treatment with preservative solutions was not feasible. Some of the more promising compounds were: benzaldehyde, 2-chloropyridine, ethyl mercuric chloride, and orthochlorophenol. When several varieties of fungi must be controlled, combinations of chemicals are often most effective. Different strains of fungi tend to tolerate more of one chemical than another, especially if the substances are of different types. None of the more useful chemicals had any marked effect on "Papreg," but certain of the chemicals tended to corrode steel, aluminum, and brass. The majority of the chemicals, however, would be objectionable in foods. Such use of volatile chemicals in food packaging is not excluded in all cases as indicated by the use of diphenyl in wrappers for citrus fruits. Theodore C. Scheffer and Catherine G. Duncan. Ind. Engr Chem. 28, No. 6, 619-21 (1946).

The Beating Process

After discussing investigations on the dimensions of fibrils under the optical microscope and electron-microscope, the fibrillation and imbibition theory of beating, adhesive mucilages, bonding of fibers, and the forces involved in the cohesion of cellulose, the author reaffirms his original explanation of the beating process. He contends that the hydration of beating is produced by fibrillation of the fiber surfaces, thus increasing the external specific surface and the imbibition of water.

The mechanism of beating and fibrillation is explained most clearly by the formation of streaming potentials on the surface of the cellulose, followed by a rupture of the double electric layer under roll pressure. Theories of hydration based on vapor absorption have no bearing on the beating operation. Fibrillation probably takes place in the amorphous cellulose. In impure pulps, containing amorphous residues associated with amorphous cellulose, fibrillation may obtain more readily by virtue of the greater absorption of water by such residues. Fibrillation and its resultant effects are essentially electrostatic and ionic in nature.

Attention is again drawn to the necessity of a fuller study of the H-ion concentration during beating. Thirty-nine references are given. James Strachan. Paper-Maker 111, no 1 Ts, 1-2; no 2, Ts 13-14; no 4, Ts 33; no 5, Ts 41-2 (1946) through Bull. Inst. Paper Chem. 16, No. 12 (1946) 538-9 (1946).

Analysis of Fillers in Boards and Papers

The article gives information on the identification of fillers and methods for their determination. Both kaolin and talc remain unattacked by cold dilute hydrochloric acid. With hot acid, the former is attacked more than the latter, but enough talc will dissolve to give a good test for magnesium. Treatment of the ash of paper with hot concentrated hydrochloric acid is recommended. The following determinations are recommended for kaolin:—loss of ignition, Al_2O_3, H_2O, SiI_2, Fe_2O_3 and lime; for talc:—H_2O lost at 105 deg. (as well as that lost on strong ignition), SiO_2, iron and aluminum oxides, CaO, and MgO. Chene, Deissenberg, and Canaud. Ann. chim. anal. 28, 68-73 (1946) through C.A. 40, 4518 (1946).

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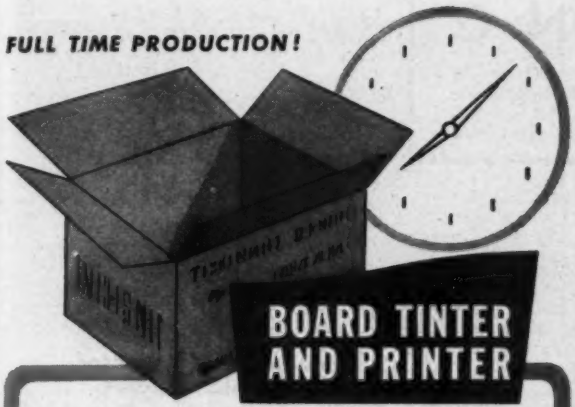

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Papermaking Machine Suction Device

Patent No. 2,395,533. Everett W. Clem, Shrewsbury, Mass., assignor to Rice Barton Corporation, Worcester, Mass., a corporation of Massachusetts. Application December 3, 1943. Serial No. 512,759. 5 Claims. (Cl 92—51).

1. In a paper making machine having an endless wire on which a paper web of variable width is laid, a stationary suction box comprising a perforated top over which the wire travels and walls defining the sides and bottom of a suction chamber, a movable end wall for the suction chamber, means for adjusting the position of the end wall, an expansible sealing member surrounding the periphery of the wall and forming an annular fluid space, and means for admitting fluid under pressure into said space which includes a pipe line connected with an external fluid source outside of the suction box for inflating the sealing member into sealing contact with the top, sides and bottom of the box irrespective of pressure conditions within the suction chamber.

Papermaking Machinery

Patent No. 2,396,695. John E. Goodwillie, Beloit, Wis., assignor to Beloit Iron Works, Beloit, Wis., a corporation of Wisconsin. Original application May 31, 1941. Serial No. 396,066. Divided and this application February 25, 1944. Serial No. 523,801. 3 Claims. (Cl. 92—43).

2. In a paper making machine, a movable forming wire, means defining a stock chamber along a portion of said wire to deposit stock onto the wire, a plurality of rows of corrugated disks in said chamber adjacent said forming wire, and disks in each row being in spaced relation and the disks in adjacent rows having their peripheries in overlapped relation, each corrugated disk having the corrugations thereof arranged to define radial pockets for impelling stock, and means for rotating all of said disks in the same direction to create a circulating envelope of stock in the chamber adjacent the forming wire for moving the stock in the direction of movement of the forming wire immediately before the stock is deposited onto the wire.

Process of Separating and Recovering Constituents of Waste Liquor From the Soda and Sulphate Processing of Coniferous Woods

Patent No. 2,395,284. Joseph John Lovas, Ridgewood, and Paul P. Bruins, Douglaston, N. Y. Application August 1, 1942. Serial No. 453,292. 8 Claims. (Cl. 260—97.5).

1. In a process of separating and recovering constituents of tall oil and other mixtures containing chiefly water-insoluble fatty acids, rosin acids, sterols and pitch, which comprises selectively esterifying the fatty acids only with a monohydric alcohol in the presence of an esterifying catalyst, saponifying the rosin acids with sodium hydroxide and stripping off the excess alcohol, the step of adding a substantially anhydrous aliphatic ketone selected from the group consisting of acetone, methyl-ethyl ketone and diethyl ketone to the mixture of esterified and saponified constituents, whereby the constituents are dissolved with the exception of light sodium abietate, and removing the light sodium abietate.

Method of Coating Paper

Patent No. 2,391,621. George M. Powell, III, South Charleston, and William H. McKnight, Charleston, W. Va., assignors to Carbide and Carbon Chemicals Corporation, a corporation of New York. No drawing. Application September 17, 1943, Serial No. 502,816. 1 Claim. (Cl. 117—65).

Process for coating paper which comprises dispersing a copolymer of vinyl chloride 86%, vinyl acetate 13%, maleic acid 1%, a copolymer of vinyl chloride 87% and vinyl acetate 13%, and a paraffin wax, in a mixture of methyl ethyl ketone, methyl isobutyl ketone and hydrogenated petroleum naphtha, the ratio of ketones to naphtha being about 2.3 to 1, the ratio of the two copolymers being 1 to 2 and 2 to 1, and the proportions of wax being from 10 to 25% of the two copolymers combined, heating the dispersion to a temperature above the melting point of the wax, cooling and agitating the dispersion to form a finely-divided solid suspension of the wax in the fluid resin dispersion, forming a thin wax-containing film of said copolymer on the surface of the paper, baking the paper at a temperature of 225° to 275° F., and forming an adherent, glossy, abrasion and moisture resistant coating on the paper.

Apparatus for Applying Coatings to Web Material

Patent No. 2,393,529. Herman R. Harrigan, Chevy Chase, Md., assignor to District of Columbia Paper Mills, Inc., Washington, D. C., a corporation of Virginia. Application January 19, 1940, Serial No. 314,695. 4 Claims. (Cl. 91—50).

1. In an apparatus for coating web material, the combination with a transfer member having a substantially smooth and non-absorbent surface for transferring fluid coating material to the web material, of a fluid feeding roller maintained out of contact with the web material and having a multiplicity of equal and uniform minute pocket-like surface indentations distributed over substantially the entire surface of said roller, said indentations being regularly spaced and operative to receive and measure equal minute portions of the fluid coating material and the area of indentations being in excess of the spacing surfaces between said indentations, whereby said roller is operable to deposit fluid coating material in separate minute portions from said indentations upon the surface of said transfer member to merge thereon and be transferred therefrom to said web material as a continuous film of substantially uniform thickness throughout the area of the web material.

Manufacture of Paper for Photographic Purposes

Patent No. 2,358,056. Halford Rogers Clark, Rochester, N. Y., assignor to Eastman Kodak Company, Rochester, N. Y., a corporation of New Jersey. Application July 27, 1940, Serial No. 348,013. 5 Claims. (Cl. 95—8).

1. A photographic paper essentially consisting of paper having a coating thereon essentially consisting of barium sulfate dispersed in polyvinyl alcohol, and an overcoating of a photographic emulsion essentially consisting of silver halide and a carrier therefor selected from the group consisting of gelatin and polyvinyl alcohol, the barium sulfate coating protecting the emulsion from substances having a derogatory effect thereon.

Method of Treating Paper Stock

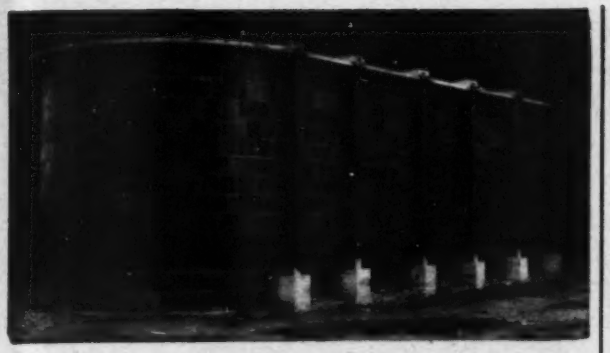
Patent No. 2,390,695. John C. Dean, Douglaston, and Roy T. Edwards, New York, N. Y., assignors to Socony-Vacuum Oil Company, Incorporated, a corporation of New York. Application April 25, 1942. Serial No. 440,488. 4 Claims. (Cl. 92—1.6).

1. That method for the removal of pitchy materials from paper pulp stocks comprising the steps of contacting the stock while in a digested and acid condition with an invert emulsion of a solvent for such pitchy material to substantially dissolve the pitchy material therein, then changing the phase relationships of the emulsion and washing the emulsion, containing dissolved pitch, from the stock.

Coated Paper

Patent No. 2,392,972. La Verne E. Cheyney, Akron, Ohio, assignor to Wingfoot Corporation, Wilmington, Del., a corporation of Delaware. No drawing. Application November 15, 1944, Serial No. 563,624. 14 Claims. (Cl. 117—76).

1. A method of preparing a water-vapor-resistant surface on a porous paper which comprises coating the paper with a polymer of a monomeric substance containing at least 75 percent of vinyl chloride, said polymer being insoluble in an aromatic hydrocarbon but capable of being swelled by the contact with said hydrocarbon, treating the coated paper with a solution of a copolymer of from 40 to 80 percent vinylidene chloride and from 60 to 20 percent vinyl chloride dissolved in an aromatic hydrocarbon, and evaporating said aromatic hydrocarbon.



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New Catalogues and Publications

American Pipe & Construction Co., Amercoat Div., P. O. Box 3428, Terminal Annex, Los Angeles 54, California —Characteristics and properties of Amercoat plastic coatings for industrial use in the paper, chemical, and allied industries are outlined in a new technical bulletin. The information is charted and copies of these charts are available on request. Selection of the proper coating, preparation of surface, and application methods of steel, concrete, and wood are among the data contained in the bulletin.

Automatic Transportation Co., 149 W. 87th St., Chicago 20, Ill.—"The Transtacker," an eight-page, three-color brochure has just been published by this company to explain and illustrate the new high lift tiering unit which operates as the hand truck counterpart of fork and platform lift trucks. Sketches and photographs show the operation of the four models of Transtackers; dimensional specifications are given, and a technical summary is included in the booklet.

Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.—D. P. Eckman and Louis Gess have co-authored this recent publication entitled "Pneumatic Transmission of Instrument Readings Over Long Distance." The purpose of the booklet is the study of industrial instrumentation and developments that have taken place in the field. Results and recommendations concerning specific instrument tests are outlined.

Dicalite Company, 756 S. Broadway, Los Angeles, Calif.—A new technical bulletin, No. F-51, describes Dicalite Paper-Aids and outlines the most important features regarding their use as well as results to be expected. The text is amplified with a number of illustrations, graphs, tables, and photomicrographs. Mills making paper and pulp products may obtain this bulletin gratis.

Electric Machinery Mfg. Co., Minneapolis 13, Minn.—The latest issue of the **E-M Synchronizer** (Vol. 7, No. 3) is devoted to a complete but comprehensive treatment of "The ABC of Synchronous Motor Control." The how, why, when and what of modern synchronous motor control is detailed with more than 45 diagrams and photographs. The booklet contains 20 pages; it is well laid out and printed in three colors. Of special interest to motor users is the selection chart which has been prepared to serve as a guide for preliminary selection of the type of synchronous motor control, and accessory features if required. The fourth cover is devoted to suggestions for the operator on how to keep his Control in good condition.

Food Machinery Corp., Peerless Pump Division, 301 West Avenue 26, Los Angeles 31, Calif.—A fanfold bulletin of six pages describes the design, construction and application of three types of Peerless Vertical Centrifugal Pumps for general purpose pumping in a wide variety of industrial services. The three types illustrated are: the close-coupled type, and the vertical centrifugal, with bottom or top suction. Section drawings of the two latter types are given.

Goodrich Co., B. F., Akron, Ohio—Catalogue sections covering suction hoses and suction hose uses and services, as well as various brands of industrial water hose are described in Bulletins 4600 and 4800 which will be sent on request.

Mason-Neilan Regulator Co., 1196 Adams St., Boston, Mass.—A new comprehensive control valve catalogue has been released by this company. Interesting comparisons and discussions of valve flow coefficients and curves demonstrate the theory of control valve operation. This data constitutes a basis for engineered selection of control valves to fit specialized applications. Mechanical design and operation of Masoneilan control valves are described and illustrated. Also, dimensions, weights, materials of construction, and other specifications are included.

Norton Company, Worcester 6, Mass.—In a recent publication entitled "Roll Grinding," information of value to the industry concerning the maintenance of various types of mill rolls is digested. A complete section is devoted to the grinding of paper mill rolls with emphasis placed on chilled iron rolls and rubber covered rolls. Roll grinding wheel specifications are listed for chilled iron, brass, rubber, and granite paper mill rolls.

Porter, H. W., & Co., 825 Frelinghuysen Ave., Newark, N. J.—In bulletin No. 461, a four-page, two-color, illustrated pamphlet just published, timely data on the advantages of Therm-O-Tile, underground pipe conduit engineered and manufactured by this company, are given.

Preformed Wire Rope Information Bureau, 520 N. Michigan Ave., Chicago 11, Ill.—A catalogue published by this bureau under the title, "Preformed Rope—What it is—What it does," answers questions concerning the use of wire rope in industry in nontechnical language. The publication summarizes the benefits of the use of wire rope as an economy to industry, labor saver, production booster, and safety development. A valuable table has been prepared which lists the industries in which wire rope is used and the services in which it is employed are recommended.

Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y. — "Q-Chromastic" is the title of bulletin No. 315-E recently released by this company. The pamphlet describes the use of a plastic refractory surfacing material on various refractory constructions. The material is a protective agent for furnace brickwork.

Roy, Milton, Co., 1300 Mermaid Ave., Philadelphia 18, Pa.—A series of technical papers published by this company dealing with automatic chemical feed systems is available. The textual material is original and it contains heretofore unpublished flow sheets on pH control. The series of technical papers Numbers 51, 54, and 55, together with bulletin No. 468 outline the various aspects of chemical feed systems.

Sun Oil Co., Industrial Products Dept., Philadelphia 3, Pa.—In Technical Bulletin No. B-1 (Revised) entitled, "Lubrication of Diesel Engines," timely information on the development of diesel engine, features of its design, maintenance of the engine, and trouble shooting suggestions are given. The trouble shooting chart is a handy reference which outlines causes and effects of operating troubles. The information in the booklet is directed toward lubrication problems, and recommendations are given for the solution of these problems.

Warren Steam Pump Co., Inc., Warren, Mass.—A new high pressure centrifugal pump which has been added to the Warren line of manufacture is described in detail in the recently issued bulletin No. 241. The pump is designated as Warren 4 and 6 Stage Type TM Pump.

Whiting Corp., Harvey, Illinois—The function of the overhead crane in aiding work flow is the subject of a new bulletin, "Paper Handling With Whiting Cranes." Features of the operation of the overhead crane such as quiet operation, roller bearings, and oil tight gear housing are described and uses in paper handling illustrated. Special features of various types of grapples are also discussed.

Worthington Pump and Machinery Corp., Harrison, N. J.—Bulletin 1-640-B1A, just released, is a complete catalogue of the Worthington Single Horizontal Compressors. Air and gas compressors are described, installations discussed and illustrated, and auxiliary equipment outlined. Special emphasis is given to the single horizontal compressor, with details of construction and operating diagrams illustrated.

Zernickow Co., O., 15 Park Row, New York 7, N. Y.—Circular O-Z Improved Tachometers covers a new line of industrial instruments placed on the market by this company. Catalogue information on service, advantages, and specifications is contained in the bulletin.

Books

Physical Methods of Organic Chemistry (Volume I) — Edited by Arnold Weissberger this book has been published by Interscience Publishers, Inc., 215 Fourth Avenue, New York 3, N. Y. The subjects covered by the book and their respective contributors follows: Determination of Melting and Freezing Temperature, Evald L. Skar and Helmut Wakeman; Determination of Boiling and Condensation Temperatures, W. Swietoslawski; Determination of Density, N. Bauer; Determination of Solubility, Robert D. Vold and Marjorie J. Vold; Determination of Viscosity, H. Mark; Determination of Surface and Interfacial Tension, William D. Harkins-Parachor, George W. Thomson; Determination of Properties of Monolayers and Duplex Films, William D. Harkins; Determination of Osmotic Pressure, R. H. Wagner; Determination of Diffusivity, A. L. Geddes; Calorimetry, Julian M. Sturtevant; Microscopy, Edwin E. Jelley; Determination of Crystal Form, M. A. Peacock; Crystallochemical Analysis, J. D. H. Donnay; X-Ray Diffraction, I. Fankuchen; Electron Diffraction, L. O. Brockway; and Refractometry, N. Bauer and K. Fajans.

The volume totals 736 pages and includes 276 illustrations and 55 tables. The price of the book is $8.50 a copy.

Physical Methods of Organic Chemistry (Volume II)—Edited by Arnold Weissberger, this volume, a companion book to Volume I, is made up of ten chapters and a combined subject index for both volumes. The chapters (XVII to XXVI inclusive), in order of their appearance and with their respective contributors follow: Spectroscopy and Spectrophotometry, by W. West; Colorimetry, Photometric Analysis, and Fluorimetry, by W. West; Polarimetry, by W. Heller; Determination of Dipole Moments, by C. P. Smyth; Conductometry, by Theodore Shedlovsky; Potentiometry, by L. Michaelis; Polarography, by Otto H. Müller; Determination of Magnetic Susceptibility, by L. Michaelis; Determination of Radioactivity, by W. F. Bale and J. F. Bonner, Jr., and Mass Spectrometry, by David W. Stewart.

Totaling more than 600 pages, with 264 illustrations and 43 tables, the book is priced at $8.50 a copy.

You—Triumphant — Written by Eugene J. Benge, personnel consultant, this volume is intended as a guide to personal living. The author breaks down his subject into challenges rather than chapters. There are twelve of them. They are: Man—Know Thyself, The Physical You, Make Your Environment Efficient, Explore Your Mind, Understanding Human Behavior, Grow By Doing, Memory—The Bogey Man, Use the Power of Your Interest, Become A Social Being, Strategy in Handling Others, Adventures in Contentment, and Want to Succeed. It is a book about 300 pages, and is priced at $3.00 a copy. The publisher is Harper & Brothers, 49 E. 33rd St., New York 16, N. Y.

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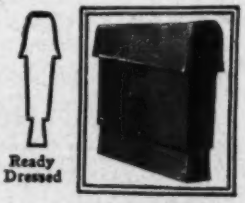

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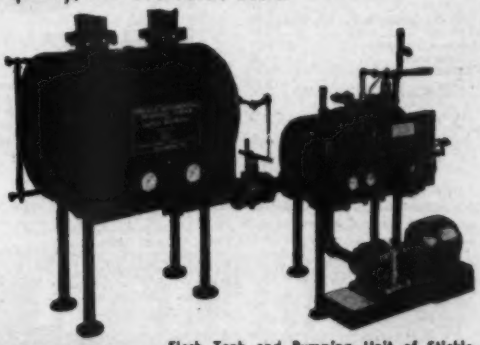

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CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

OPA ceiling prices in sales to consuming mills delivered buyer's usual receiving point, with brokers' allowance not in excess of 5 per cent.

	per cwt.
Blue Overalls	–5.50
Corduroy, Men's	–3.50
Corduroy, Ladies'	–3.00
Washables, No. 1	–3.00
Percales	–4.75
New Soft Blacks	–3.75
Light Prints, No. 1	–4.50
Khaki Cuttings—	
Bleachable	–4.25
Unbleachable	–3.50
New White Canvas	–6.50
New Mixed Blacks	–3.25
Canton Flannels, Bleached	–7.00
Shirt Cuttings—	
New White No. 1	–7.25
No. 1 White Headings	–7.25
White Shrunk	–5.00
Silesias No. 1	–5.75
New Unbleached	–7.50
Fancy	–3.50
Linen Cuttings—	
American	–5.00
White	–14.00
Grey	–14.00

RAGS (Domestic)

f. o. b. New York City

OLD RAGS

OPA ceiling prices in sales to consuming mills f. o. b. cars at points of shipment, with brokers' allowance of $1 to $2 a ton depending on the value of the grade involved.

Bagging	per ton
No. 1	31.00
No. 2	29.00
No. 3 and No. 4	27.00
Twos and Blues—	
Repacked	44.00
Thirds and Blues—	
Repacked	44.00
Miscellaneous	36.00
Whites, No. 1—	
Repacked	76.00
Miscellaneous	64.00
White, No. 2—	
Repacked	58.00
Miscellaneous	53.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shapperies	

ROPE and BAGGING

f. o. b. and ex dock New York City

Gunny No. 1—	per cwt.
Foreign	Nominal
Domestic	$4.75 to 5.00
Wool Tares—	
Light	4.75 to 5.00
Heavy	5.00 to 5.25
No. 1 Scrap Bagging	3.75 to 4.00
Manila Rope—	
No. 1 large	–*115.00
No. 1 small	–*105.00
Sisal Rope—	
No. 1 large	–*95.00
No. 1 small	–*80.00
New Burlap Cuttings	5.50 to 5.75
Jute Threads—	
Foreign (Nom.)	6.25 to 6.75
Domestic	5.50 to 6.00
Strings—	
No. 1 sisal	–*80.00
No. 2 sisal	–*60.00
Soft jute	5.00 to 5.50
Mixed	2.00 to 2.25

*OPA ceiling price per ton f. o. b. shipping point.

WASTE PAPER

OPA ceiling prices f. o. b. points of shipment for machine compressed bales weighing not less than 500 pounds (with differential of 35 per ton less on certain grades for loose or bundled stock), plus $3.00 per ton loading charge, and brokers' allowance of 4 to 9 per cent.

Shavings—	per ton
White Env. Cuts, One-Cut	67.50–
Hard White Env. Cuts	62.50–
Hard White, No. 1	57.50–
Soft White, No. 1	50.00–
Soft White, One-Cut	57.50–
Soft White, Misc.	42.00–
Fly Leaf, No. 1	33.50–
Fly Leaf, Woody, No. 1	25.00–
No. 2 Mixed Col. Woody	18.00–
Flat Stock—	
No. 1 Heavy Books and Magazines	38.50–
Mixed Books	22.50–
Ledger Stock—	
No. 1 White	46.00–
No. 1 Mixed (Colored)	40.00–
Manilas—	
New Env. Cuttings	53.00–
New Env. Cuts, One-Cut	37.50–
Extra Manilas	30.00–
Manila Tab Cards, Free of Ground Wood	45.00–
Ground Wood Manila Tab Cards	27.00–
Kraft—	
Envelope Cuttings	65.00–
Mixed Env. or Bag Cuts.	55.00–
Tripled Sorted No. 1 Brown	50.00–
New 100% Cor. Cuts	45.00–
No. 1 Old Assorted	35.00–
News—	
White Blank	23.00–
Oversizes	22.00–
No. 1 Baled	20.00–
Old Corrugated Containers	28.00–
New Corrugated Cuts	18.00–
Mill Wrappers	22.00–
Box Board Chips	14.50–
No. 1 Mixed Paper	19.00–

CHEMICALS

f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.25–
Ground, cwt.	4.00–
Powdered, cwt.	4.40–
Blanc Fixe—	
Pulp, bulk, ton	49.00 to 46.50
Dry, barrels, pound	60.00 to —
Bleaching Powder—	
Drums, cwt.	2.25 to 3.10
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	—
Argentine, lb.	
China Clay—	
Domestic Filler Bulk (mine) ton	9.00 to 15.00
Domestic Coating Bulk (mine) ton	12.00 to 22.00
Imported (ship side) Bulk (lump) ton	23.00 to 25.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicin), lb.	.90 to .95
Glyc. (C.P.) drums, lb.	21.00 to 21.25
Litharge, powd., bbl., lb.	.09¾ to 10¾
Rosin (Gum)—	
New York, per 100 lbs.	
E	8.25—
F	8.50—
G	8.50—
WW	8.85—
Rosin (Wood), carlots	6.00—
Salt Cake—	
Dom. bulk (wks) ton	15.00 to 16.00
Imp. bulks on dock—	
(Atl. ports) ton (Nom.)	20.00 to —
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt	1.05 to 1.35
Soda (Caustic)—	
Solid, drums, cwt.	2.30–
Ground and flake, drums, cwt.	2.70 to 2.95
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 55 gal. drums, (works), cwt.	.80 to 1.45
Starch—	
Pearl,140 lb. bags, cwt.	5.87—
Pearl, barrels, cwt.	5.98—
Paper (8p.) bags, cwt.	5.98—
Powdered, barrels, cwt.	6.02—
Sulphur (Crude) (Mine) bulk, long ton	16.00 to —
Talc—	
Dom. 100 lb. bags (mine) ton	16.00 to 25.00
Canadian	24.00 to 30.00
Titanium Dioxide—	
Barium Pig., bbls., lb.	.65¾ to .68¾
Calcium Pig., bbls., lb.	.95 to .95¼
Zinc-Sulphide, bbls., lb.	8.25 to 8.50

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OPA maximum prices applicable to wood pulp delivered to consumer mills located East of the Continental Divide exclusive of Denver, Colo. (West of the Continental Divide and in Denver, Colo., ceilings are $6 per ton lower):

Bleached softwood sulphite	103.50
Unbleached softwood sulphite	90.00
Bleached hardwood sulphite	100.50
Unbleached hardwood sulphite	87.50
Northern bleached sulphate	103.50
Southern bleached sulphate	97.00
Northern semi-bleached sulphate	93.00
Southern semi-bleached sulphate	91.50
Northern unbleached sulphate	83.50
Southern unbleached sulphate	76.50
Bleached soda	93.50
Unbleached soda	85.00
Ground wood pulp	64.00
Ground wood—paper machine dried and mutilated	67.00
Sulphite screenings	50.00
Sulphate screenings	44.00
Ground wood screenings	37.50
Northern unbleached sulphate siderums	83.50
Southern unbleached sulphate siderums	76.50
Standard news print siderums	64.00

PAPER

f. o. b. New York City

Boards—	per ton
Binders	90.00—
Chip	58.00—
Chip, tube and can	58.00—
Chip, full-blending	60.00—
Chip, sgl. mla. lined	65.00—
Coated, white patent .016	84.00—
.020 and heavier	79.00—
Kraft liner	74.00—
Filled News	58.00—
Container	58.00 to 60.50

Book Papers—OPA base maximum prices per cwt. 4 cases or equivalent, f. o. b. mill with quantity, weight, manufacturing and other differentials allowed:

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	9.25
B Grade E. F.	8.85
C Grade E. F.	8.35
D Grade E. F.	8.25
No. 2 Uncoated Offset 4 sides. White	8.45

Coated White (Trimmed 4 sides)

No. 1 Glossy	13.05
No. 2 Glossy	12.40
No. 3 Glossy	11.00
No. 4 Glossy	11.15
C2S Offset	10.40
C1S Litho (Varnish)	10.05
C1S Litho (Non-Varnish)	9.80

Writing Papers—OPA base maximum prices per cwt. on writing papers, f. o. b. mill with none, quantity, packing and other differentials allowed:

Rag Content Bond—	per cwt. 20 lb.	16 lb.
Extra 100% Rag	34.00	34.00
100% Rag	28.00	28.00
75% Rag	20.00	20.00
50% Rag	16.00	17.25
25% Rag	14.00	15.00

Rag Content Ledger—	per cwt. Zone 1
Extra 100% Rag	35.00
100% Rag	29.00
85% Rag	26.00
75% Rag	21.00
50% Rag	17.00
25% Rag	15.00

Sulphite Bond—	per cwt. 20 lb.	16 lb.
Air dry, watermarked	12.75	13.70
No. 1 (M.F.) watermarked	9.00	9.70
No. 2 (M.F.) watermarked	8.25	8.85
Plain (M.F.) unwatermarked	7.60	8.20

Sulphite Ledger—	per cwt. Zone 1
No. 1 (M.F.) watermarked	10.00
No. 2 (M.F.) watermarked	9.25
Plain (M.F.) unwatermarked	8.60

Glassine (f. o. b. mill)—	per cwt.
Embossed (25 lb. up)	13.75 to 14.25
Bleached (25 lb. up)	12.75 to 13.25
Unbleached (25 lb. up)	11.50 to 12.00
Greaseproof—	
Bleached (25 lb. up)	11.00 to 11.50
Unbleached (25 lb. up)	10.00 to 10.50

News—OPA Ceilings—	per ton
Rolls, Standard (Contract)	74.00
Rolls (Spot)	(Nominal)
Sheets	

Tissues (Carlots)—	per ream
White, No. 1	1.12½ to 1.20
White, No. 2	.90 to 1.00
Bleached Anti-Tarnish	1.15 to 1.20
Colored	—
Anti-Tarnish Kraft	.70–
Manila	.90 to .95
Napkins, semi-crepe (12¼ lb. to M shts.) per cs.	.60–
Napkins, full crepe and emb'sed (12¼ lb to M shts.) per cs.	.60–
Toilet, Bleached (M shts.) per cs.	6.05—
Toilet, Unbleached (M shts.) per cs.	4.47—

Towels—	per case
Bleached	3.39 to 3.99
Unbleached	2.76 to 3.43

Wrappings (Kraft)—	per cwt.
Super-Standard	5.25 to 7.05
No. 1 Wrapping	5.00 to 7.40
Standard Wrapping	4.75 to 7.15
Standard Bag	4.37½
Variety Bag	4.62½—

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)	
Bleached Papers—	per cwt.
M.F. & M.G. Waxing, 20 lb. (Carloads only)	7.25 to 7.50
(10,000 lbs.)	7.50 to 7.75
Drug wrapp. 25 lb.	7.00 to 7.25
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	5.50 to 5.75
No. 1 Butchers	5.75 to 6.00
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	6.25 to 6.50
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	6.00 to 6.25
Steam Finish, 30 lb.	5.00 to 5.25
Water Finish, 50 lb.	5.50 to 5.75

Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	6.00 to 6.50
Envy. Mla., Sub. 16-28 (No. 2)	5.75 to 6.00
Envy. Mla. (Prices based on large sheets untrim'd ream-marked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	6.00 to 6.25
No. 2	5.75 to 6.00
M.G. Sulphite and Kraft (other than Waxing)	
Grade B-30 lb.	6.75 to 7.00
Grade A-32 lb.	7.30 to 7.40

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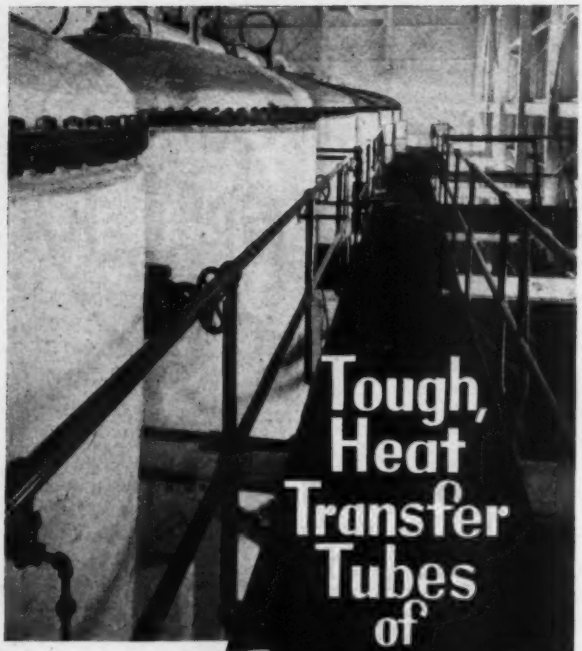

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Bird Machine Company .....
Birk & Choporis .....
Black-Clawson Co., The..... 924
Bowser, Incorporated 1053
Bowsher Co., The N. P. 1061
Brown Instrument Co., The 958
Buffalo Forge Company .....
Buffalo Pumps, Inc. .....

Calco Chemical Division, American Cyanamid Company .....
Cambridge Instrument Co., Inc.....1030
Cameron Machine Co. 1051
Carbonite Metal Co., Ltd. .....
Carthage Machine Co. .....
Cash Company, A. W. .....
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Chicago Electric Company 1024
Chromium Corp. of America 1035
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Clayton Manufacturing Co. .....
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Columbia Chemical Division 949
Columbian Carbon Company .....
Columbian Carbon Company, Magnetic Pigment Division 1057
Cooper Alloy Foundry Co., The.....
Crane Co. 1009

Darnell Corporation, Ltd. 1054
De Laval Steam Turbine Co. 922
DeZurik Shower Company .....
Diamond Alkali Company 918
Dilts Machine Works..... 924
Dodge Manufacturing Corporation.... 974
Dow Chemical Co., The..... 929
Downingtown Mfg. Co. .....4th Cover
Draper Brothers Company 1037
Dresser Industries, Inc. .....
du Pont de Nemours & Co., E. I..... 923
Duriron Co., Inc., The .....

Eastern Stainless Steel Corp. 967
Eastwood-Neally Corporation 1018
Economy Co., Inc. .....
Electric Machinery Mfg. Co. .....
Electric Steel Foundry .....
Elwell-Parker Electric Co., The.....
English China Clays Sales Corp. 1043

Fairbanks, Morse & Co. 1001
Falk Corporation, The .....
Ferguson & Co., Hardy S. 1050
Fitchburg Screen Plate Co., Inc.....
Fleishel Lumber Company 1024
Flexible Steel Lacing Co. 1064
Flori Pipe Company .....
Foxboro Company, The .....
Fritz Publications, Inc. 1059, 1066

Garlock Packing Co., The.....
Gates Rubber Company 1027
General American Transportation Corporation .....
General Chemical Company 925
General Electric Company .....
Glidden Company, The .....
Goslin-Birmingham Mfg. Co., Inc. ...
Goulds Pumps, Inc. .....
Grinnell Company, Inc. 971
Groch Engineering Co. .....
Gruendler Crusher & Pulverizer Co..

Hanchett Manufacturing Co. 1055
Hardy, George F. 1057
Harper Company, The H. M. 961
Harrington & King Perforating Co..1057
Harris-Seybold Company .....2nd Cover
Hooker Electrochemical Co. 1029
Hooper & Sons Co., Wm. E..... 975
Hudson-Sharp Machine Company 1057
Hunt Machine Co., Rodney 1054
Huyck & Sons, F. C. 956
Hyster Company .....

Improved Paper Machinery Corp. ....
Ingersoll-Rand Company .....
Ingersoll Steel & Disc. Div., Borg-Warner Corporation .....
International Nickel Co., Inc. 951

Jeffrey Mfg. Co., The 946
Jenkins Bros. 956
Johnson Corporation, The 961
Jones & Sons Company, E. D..... 957
Jones Foundry & Machine Co., W. A..1041

Kalamazoo Tank & Silo Co. 1059
Kalamazoo Vegetable Parchment Co.. 952
Kelco Company 969
Kohler System Co., The.....
Koppers Company, Inc., Bartlett-Hayward Division .....

Langston Co., Samuel M.....3rd Cover
Layne & Bowler, Inc. 1004
Lewellen Manufacturing Co. .....
Lindsay Wire Weaving Co., The.....1064
Link-Belt Company .....
Lockport Felt Company 1045
Lodding Engineering Corp. 928
Lunkenheimer Co., The 1020

Magnetic Pigment Division, Columbian Carbon Company 1057
Magnus Chemical Co., Inc. .....
Mason-Neilan Regulator Co. 970
Mathieson Alkali Works, Inc. .....
Michigan Steel Casting Co. 1053
Midwest Piping & Supply Co., Inc.... 926
Monsanto Chemical Company .....
Morey Paper Mill Supply Co. .....
Mt. Vernon-Woodberry Mills, Inc. ....
Murray Mfg. Co., D. J. 1061
Nash Engineering Co., The 1053
National Bearing Division, American Brake Shoe Company 921
National Oil Products Co. 976
National Publishers Assn., Inc. .....
National Research Bureau, Inc. .....
National Safety Council, Inc. 1063
Naylor Pipe Company .....
Nichols Engr. & Research Corp. .....
Norma-Hoffmann Bearings Corp.....
Northern Engineering Works..... 953
Northwest Engineering Co. .....
Norton Company .....

Oakite Products, Inc. 1047
Ohio Injector Co., The.....1016
Oliver United Filters, Inc. .....
Orr Felt & Blanket Co., The.....
Orton Crane & Shovel Co. .....
Owen Bucket Company, The 1049

Paper & Industrial Appliances, Inc....
Paper Makers Chemical Dept. of Hercules Powder Company.....962, 963
Patterson Foundry & Mach. Co..1st Cover
Peerless Pump Div., Food Machinery Corporation .....
Perfecting Service Company.....1047
Perkins & Son, Inc., B. F.....1007
Permutit Company, The.....
Philco Corporation 1053
Pittsburgh Piping & Equipment Co...
Pittsburgh Plate Glass Co., Columbia Chemical Division 949
Poole Foundry & Machine Co. 1047
Powell Company, The Wm. 993
Pusey & Jones Corp., The..... 933

Raymond Service, Inc., Charles P.....1061
Reed-Prentice Corp. .....
Reichhold Chemicals, Inc. 1005
Reliance Electric & Engr. Co..... 945
Research Corporation .....
Rogers & Co., Samuel C. .....
Roofing Machinery Mfg. Co. .....
Roots-Connersville Blower Corp. 950
Ross Engineering Corp., J. O.....
R-S Products Corporation .....
Ryerson & Son, Inc., Joseph T....978, 1063

Sandusky Foundry & Machine Co.....
Sandy Hill Iron & Brass Works, The.1011
Shartle Bros. Machine Co..... 924
Shuler & Benninghofen 1013
Smith & Winchester Mfg. Co. 1008
Solvay Sales Corporation .....
Spraying Systems Company 1055
Sprout, Waldron & Co. 935
Standard Oil Co. (Indiana) 993
Stebbins Engr. & Mfg. Co. 1016
Stein, Hall & Company, Inc. 973
Stickle Steam Specialties Co. 1061
Sutherland Refiner Corporation 927
Swenson Evaporator Company 916

Taylor Forge & Pipe Works.....1017
Texas Company, The..... 917
Thomas Flexible Coupling Co. 968
Timken Roller Bearing Co., The..... 941
Titanium Pigment Corporation.....1033
Torrington Co., Bantam Bearings Division 1031
Towmotor Corporation .....
Trent Tube Manufacturing Co. 1064
Trimbey Machine Works 1057
Turner Halsey Company .....

U. S. A. Treasury Dept. 1039
Union Pacific Railroad Company 972
U. S. Stoneware Co. .....

Valley Iron Works Company.....
Vanderbilt Co., Inc., R. T..... 964

Waldron Corporation, John .....
Warren Steam Pump Co., Inc. 1025
Waterbury & Sons Co., H. 1053
Waterbury Felt Co., The.....
Weyerhaeuser Timber Co. .....
Whiting Corporation 916
Whittaker, Clark & Daniels, Inc. .....
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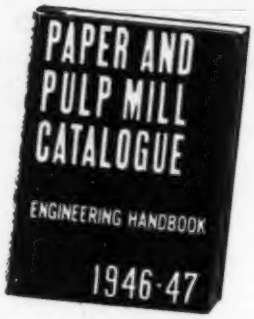

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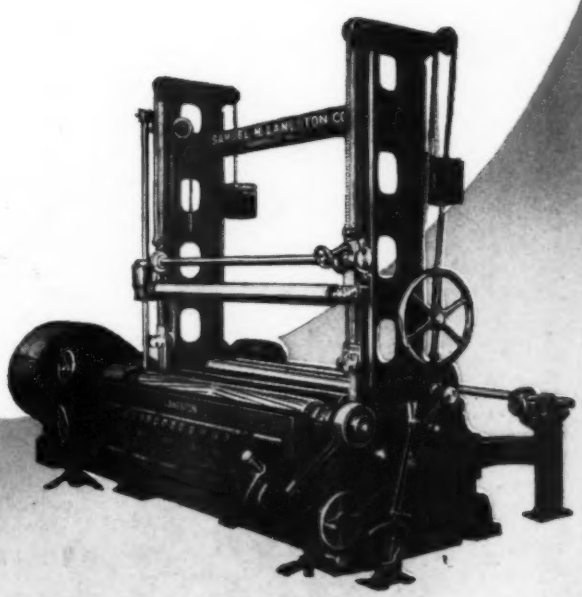

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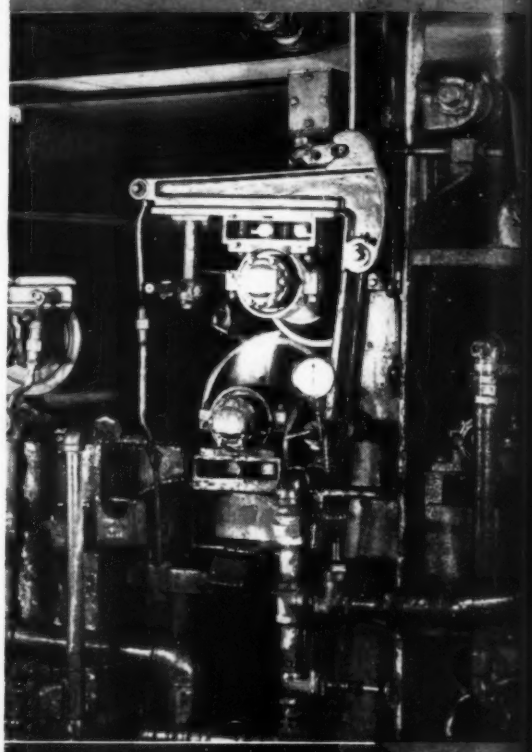

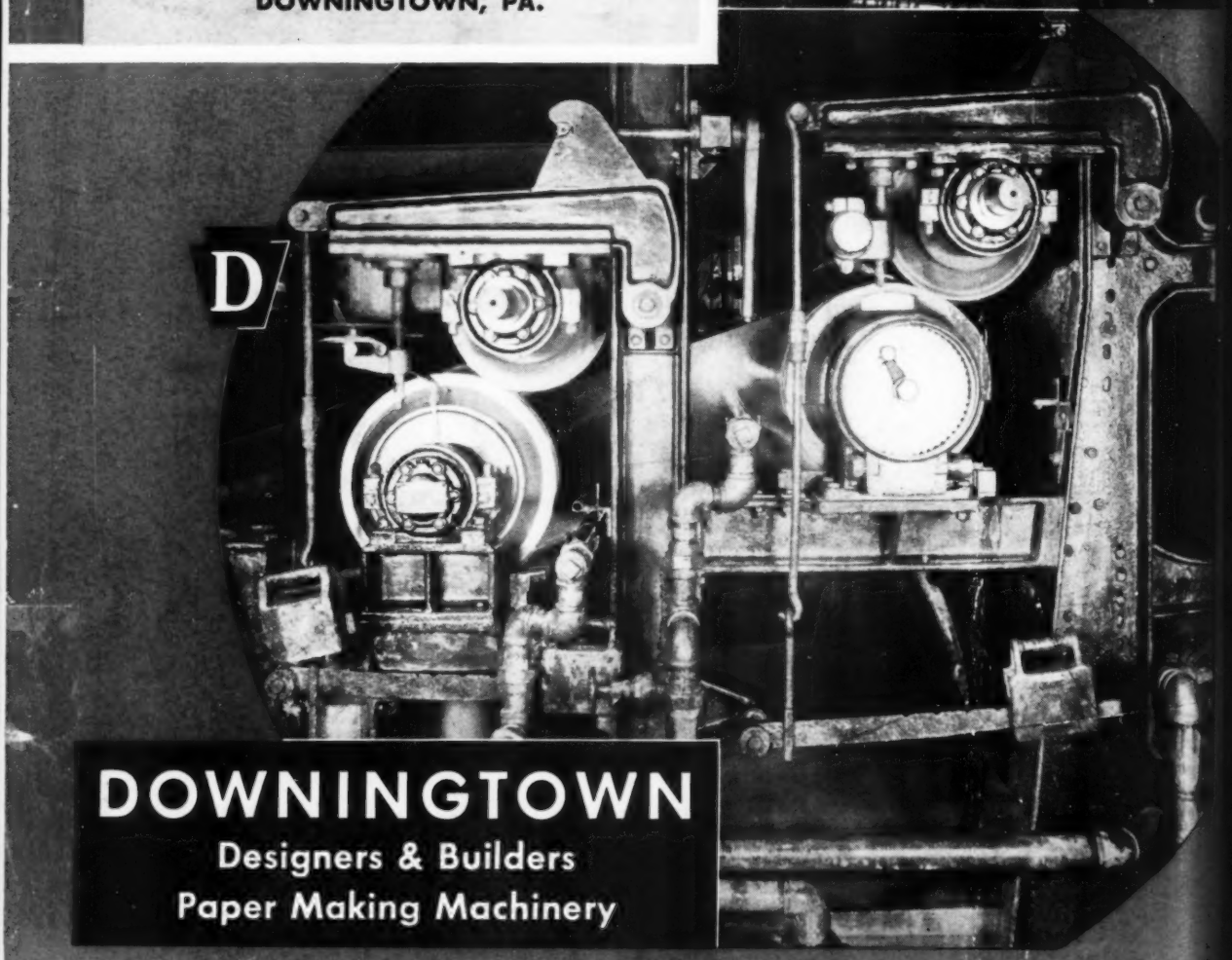

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